Vacuum Cleaning Robot

Series: VR20H90*
Basic model name: SR20H9050UW
Model code: VR20H905***
VR20H903***

SERVICE Manual

CLEANING ROBOT

VR20H9050UW

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2. Product features and specifications
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4. Assembly and disassembly
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Refer to the service manual registered at K-ZONE for information not included in this manual.

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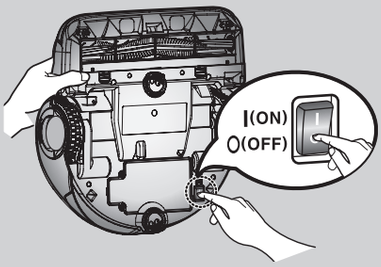
1. Safety precautions

1–1. Precautions during repair

Please repair the product while the emergency switch on its bottom is in the off position.

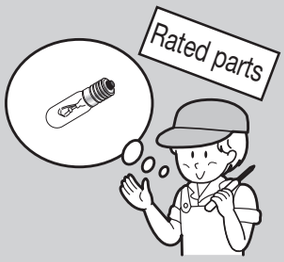
▶ The emergency switch blocks all battery



and charger power.

When exchanging electrical parts, be sure to use rated parts.

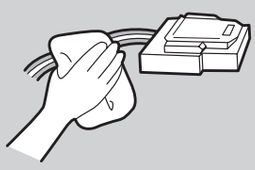
▶ Check labels indicating the part's model



name, rated voltage, rated current, operating temperature, etc.

Be sure to completely remove all dust or contamination from the housing, connection, area being inspected, etc. during repair.

▶ You can prevent the risk of fire due to tracking, shorts, etc.

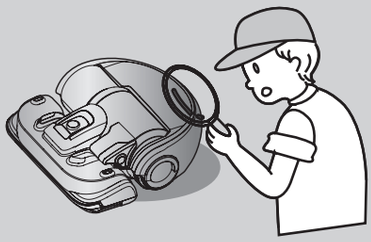


While repairing malfunctions, repair sturdily with a harness–type connection.

▶ Be careful not to use excessive force and do not allow water to enter.

Check the assembly of the product after repair.

▶ It must be identical to the condition before repair.



1–2. Safety and installation precautions

※ Be sure to follow these guidelines for your safety.
This information helps keep users safe and prevent product damage.
Please read the following information carefully and use the product safely.

People who cannot safely use the product due to physical or mental disabilities or who lack the experience or knowledge to use the product safely should not use this product without the supervision of a guardian.

220V — This product has a rated voltage of AC 100–240V.

Warnings — There is a risk of death or serious injury to the user if safety guidelines are not followed.

Caution — There is a risk of injury to the user or damage to the product if safety guidelines are not followed.

Note — We will explain the associated terminology to increase your understanding of product use.

Terminology* — This information is helpful in efficiently using the product.

This is a "do not disassemble" sign.

p — Please refer to the associated page.

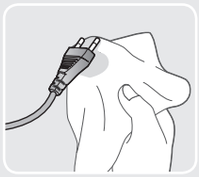
Power–related

Warnings

To avoid damaging the power cord, do not use excessive force to bend the power cord or put heavy objects on top of it.

▶ There is a risk of fire or electric shock.

If the power plug's pins or contact area become covered in dust or water, clean them thoroughly.

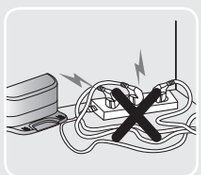


▶ There is a risk of electric shock or malfunction.

Do not pull on the power cord or touch the power plug with wet hands.

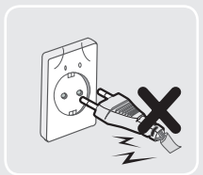
▶ There is a risk of fire or electric shock.

Do not use with voltages other than AC 100–240V or with multiple electric items plugged into one socket at the same time. (Do not leave the cord exposed on the floor.)



▶ There is a risk of fire or electric shock.

Do not use damaged power plugs, power cords, or loose sockets.

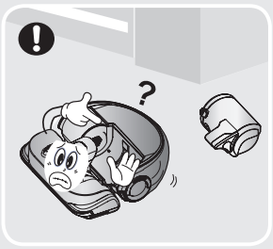


▶ There is a risk of fire or electric shock.

Before use

Caution Warnings

Before operating the cleaning robot, be sure to insert the dustbin.



- When inserting the dustbin, push until you hear a sound.

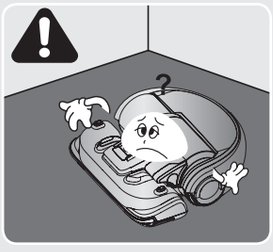
Do not use in areas containing combustible materials.

- Places where candles or desktop lamps are on the floor
- Places with embers or where wall fireplaces are lit and no one is around
- Places containing combustible materials such as gasoline, distilled alcohol, thinners, or ashtrays containing lit cigarettes

Be sure the cleaning robot does not pass through or touch liquids such as water, oil, or pet excrement.

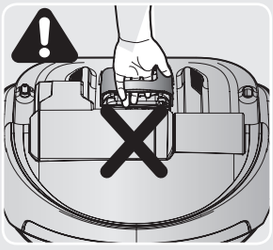
- The cleaning robot may be severely damaged.
- If the wheels pass through liquid, they may contaminate other areas.

Do not use on black floors.



- The cleaning robot may not be able to operate normally.

Do not pick up the cleaning robot by the dustbin cover.



Caution

Remove small or easily broken objects from the area before cleaning.

- ▶ Be sure to remove before cleaning.
- ▶ Remove easily broken objects such as pottery or glass, light flowerpots, and other types of item.
- ▶ The cleaning robot cannot distinguish coins, rings, expensive jewels, etc.

Remove objects scattered across the floor.

- ▶ The cleaning robot can detect obstacles from about 5 cm away.
- ▶ Thin towels, pads, power cords, tablecloths, belts, etc. in front of bathrooms, sinks, entryways, multipurpose rooms, etc. can become tangled in the drive wheel or Power Brush, and items on tables or desks may fall.

Let everyone in the house know they should be careful before cleaning or after setting up scheduled cleaning.

- ▶ Young children running or moving may trip over the robot by accident.

Be sure children do not climb or sit on the root while it is operating.

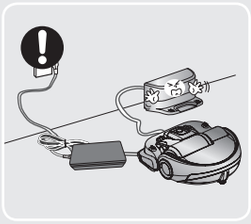
- ▶ They may fall and be hurt or cause severe damage to the product.

Turn off the cleaning robot's emergency switch when children or pets are alone with it.

- ▶ Children or pets may be curious about the robot.
- ▶ If their hands, feet, clothing or hair is caught in the wheels or drive wheel, rotating brush, Power Brush, etc. during cleaning, they may be injured.
- ▶ If the robot is obstructed during cleaning, it may recognize the obstacle and not clean that area.
- ▶ If the emergency switch is in the off position, all functions and power are blocked.
- ▶ If young children put their hands under the wheels, they may be injured. Please be careful.

Caution Warnings

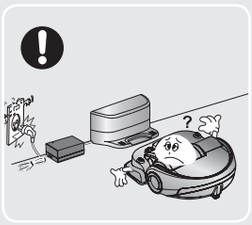
When installing the charger, do not leave the power cord exposed on the floor.



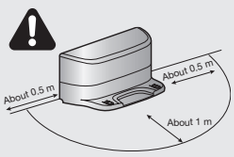
▶ The cleaning robot may become caught on the cord while automatically recharging or while passing in front of the charger.

Always plug in the charger's power plug.

▶ Automatic charging cannot be done unless power is supplied.



There must be no obstacles or areas where the cleaning robot may fall within 0.5 m to the sides and 1 m to the front of the charger.



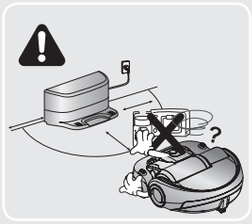
Do not short the power by putting metal such as chopsticks, screwdrivers, etc. in the charger's socket.

▶ The charger may be severely damaged.

Install the charger where the cleaning robot can easily find it.

▶ When installed in a corner, there is a lot of unnecessary movement and automatic recharging can be hindered.

If objects are left in front of the charger, the cleaning robot cannot automatically recharge.



▶ Remove objects.

Do not put water, juice or any other liquids on top of the charger.

▶ There is a risk of fire or electric shock.

Do not use the charger for anything other than its intended purpose.

▶ There is a risk of fire or severe damage to the charger.

Do not install the charger in an area with a dark floor.

▶ If the floor around the charger is dark, recharging is hindered.

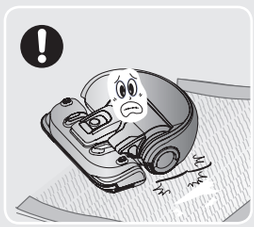
Ensure the area to be cleaned is free of slippery surfaces before cleaning.

▶ The cleaning robot's movement will be hindered.

During use

Caution Warnings Note

The cleaning robot cannot be used on thick carpet.



- ▶ This can cause the cleaning robot to malfunction.
- ▶ It can also damage the carpet.
- ▶ The cleaning robot cannot pass over carpet more than 1cm high.

Do not use the cleaning robot on tables or other high surfaces.

- ▶ There is a risk of damage if it falls.

The cleaning robot may bump into chair, desk or table legs or thin moving objects while in operation.

- ▶ Put dining room chairs on the table for faster, better cleaning.

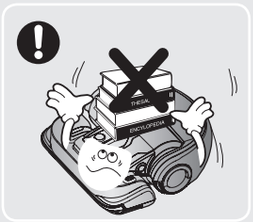
Do not carry the product to another area while it is operating.

The cleaning robot may become caught on thresholds, etc. during cleaning.

- ▶ To restart operation, shut off the emergency switch, move the cleaning robot to an area where it can move easily and then turn on the power again.

Do not hold the wheels of the cleaning robot while it is moving.

Do not put any objects on top of the robot.



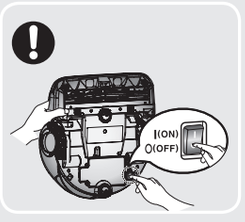
- ▶ Malfunctions may occur.

If the cleaning robot vacuums any large papers or plastic bags during cleaning, remove them immediately.

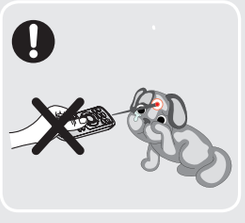
- ▶ There is a risk of severe damage to the product if it is used for a long time with a blocked intake.

If the "Empty Dustbin" light is on, please clean the dustbin.

If any abnormal sounds, smells, or smoke come from the cleaning robot, immediately shut off the emergency switch and contact a service center.



Do not aim the red pointer directly at people or animals.

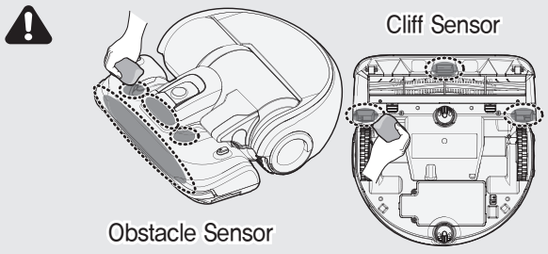


Maintenance after use

Caution Warnings

Do not get water on the exterior during repair, and do not clean with volatile materials such as benzine, thinner, alcohol, etc.

▶ There is a risk of severe damage to the cleaning robot.



Periodically clean accumulated dirt from the Obstacle Sensor and Cliff Sensor.

▶ If foreign matter accumulates, the sensors may malfunction.

When removing dirt, be sure to use cleaning brushes while the emergency switch is in the off position.

▶ If operation begins suddenly, there is a risk of injury or damage to the cleaning robot.

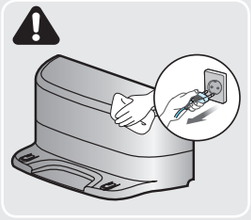
Do not disassemble or repair the cleaning robot. This should only be done by a certified repairman.

▶ There is a risk of severe damage to the cleaning robot.

If the power cord is damaged, have a qualified repairman at a service center exchange it.

▶ There is a risk of fire or electric shock.

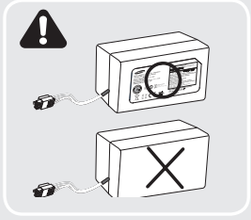
Repair the charger after unplugging its power cord.



Please check with a Samsung Electronics service center when exchanging batteries.

▶ Using batteries from other products can cause malfunctions.

▶ They may have the same form but will not work properly, so do not use them.

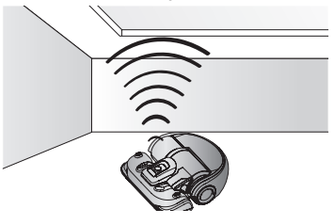


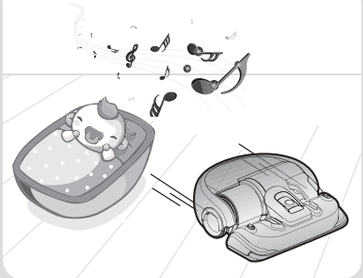
2. Product characteristics and specifications

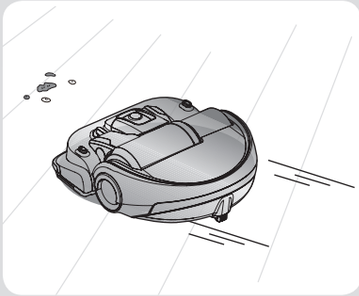
2-1. Product characteristics

What is Visionary Mapping Plus?

Through a camera on its upper surface, the cleaning robot can use Visionary Mapping Plus and then independently decide where to clean while moving to each area.





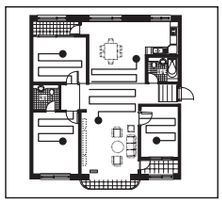


Cleans precisely and evenly everywhere

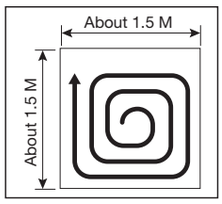
Every corner of the room can be cleaned perfectly since the cleaning robot draws a map through Visionary Mapping Plus™ while cleaning in a grid pattern (⮔).

Various methods of cleaning

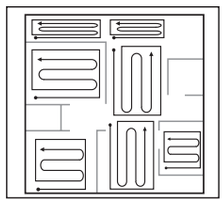
Different cleaning modes are offered to suit every situation.



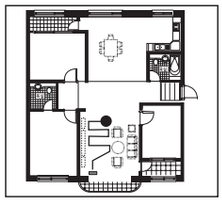
Auto Clean
Conveniently and evenly cleans all rooms.



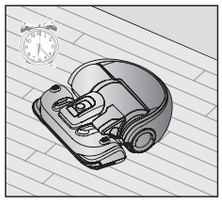
Spot Clean
Cleans a specific area, for example, if cookie crumbs have been dropped.



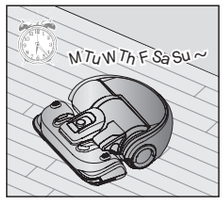
Max Clean
Repeats cleaning until the battery is drained.



Manual Clean
Use the remote control to move the cleaning robot yourself.



One-Time Schedule
Schedule cleaning for your desired time even if you are out.



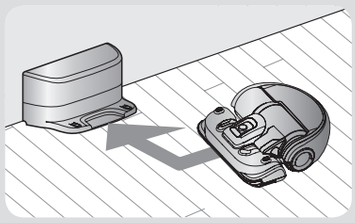
Daily Schedule
Automatic cleaning starts at the same time every day.

Silent Mode

When operating in Silent Mode, the robot cleans more quietly than in standard modes. (Standard/Silent modes can be set using the remote control.)

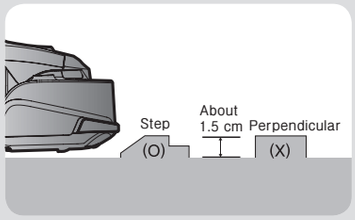
Smart Turbo Mode

If dust enters the cleaning robot, the cleaning robot concentrates cleaning on a specific area. (Can only be activated using the remote control.)



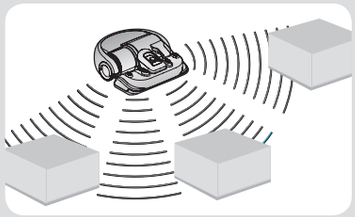
Automatic Recharging

When the remaining battery life is insufficient, the charger guides the cleaning robot to it so quick, accurate automatic recharging can begin.



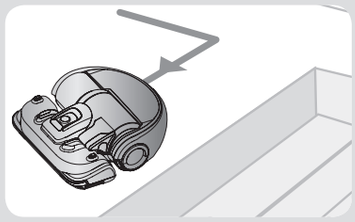
Threshold Crossing

The special drive system can move the cleaning robot over height differences of up to 1.5 cm so it can evenly clean all rooms.
For safety, it cannot bypass areas with height differences of more than 1.5 cm.



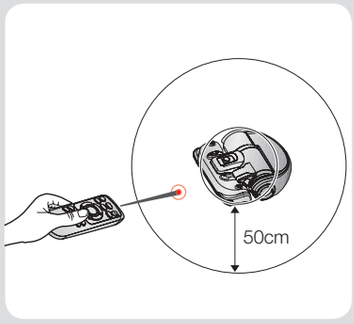
Collision Avoidance

The cleaning robot's sensor detects and avoids potential obstacles it encounters while cleaning. (It may not sense thin, moving obstacles)



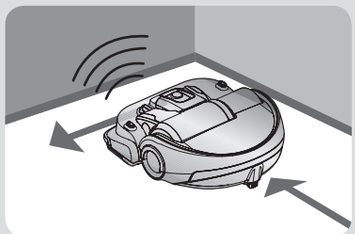
Cliff Sensor

The Cliff Sensor detects stairs, doorways, etc. where there is a risk to the cleaning robot and prevents it from falling.



Point Cleaning (optional)

You can use the remote control's Point Cleaning button to move the cleaning robot to your desired location to clean. (not available for regular models)



Soft Bumping

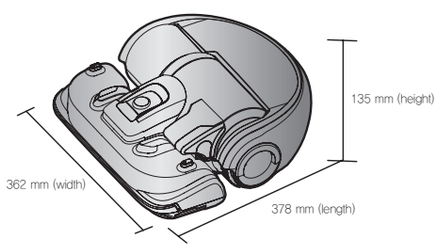
When the Obstacle Sensor detects walls, it reduces the drive speed of the cleaning robot so all bumps are gentle.

2–2. Product specifications

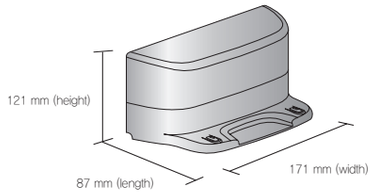
Category	Item	Information	VR20H9050U*	VR20H9030U*
Mechanical specifications	Width	378 mm	O	O
	Height	135 mm	O	O
	Length	362 mm	O	O
	Weight	Main body: 4.8 kg/Total weight: 7.6 kg	O	O
Power specifications	Power voltage	Single phase AC 100V ~ 240V, 50Hz/60Hz	O	O
	Charger voltage	24.9V	O	O
	Battery specifications	Lithium ion 21.6V/84Wh	O	O
Cleaning area	Cleaning method	Visionary Mapping Plus	O	O
	Cleaning mode	Auto Clean	O	O
		Spot Clean	O	O
		Max Clean	O	O
		Manual Clean	O	O
	Schedule Functions	One-Time Schedule	O	O
		Daily Schedule	O	O
	Cleaning Functions	Point Cleaning	O	X
		Silent Mode	O	O
		Smart Turbo Mode	O	O
	Dustbin capacity	0.7L	O	O
	Intake method	Intake	O	O
	Main brush	Power Brush	O	O
	Cleaning time	Remaining time until battery is drained	Standard 60 minutes/ Silent 100 minutes	Standard 60 minutes/ Silent 100 minutes
Control functions	Main body buttons	3 buttons	O	O
	Remote control buttons (Point Cleaning)	17 buttons	O	O
	Remote control buttons (regular)	15 buttons	O	O
	Emergency switch	LOCKER	O	O
Display functions	Main body display	LED module	O	O
Charging functions	Charging method	Automatic charging/manual charging	O	O
	Charging time	Time to full battery	160 minutes	160 minutes
Sensor functions	Cliff Sensor	Infrared sensor	O	O
	Obstacle Sensor	WiLD Sensor	O	O
	Bumper Sensor	MICRO S/W	O	O
	Drum contamination sensor	Encoder	O	O
	Wheel contamination sensor	Encoder	O	O
NOISE	Sound Pressure	Korea Industry Standards(dB)	Standard 65dB	
			Silent 59dB	

▶ Charging and cleaning times may differ depending on conditions such as temperature of the robot, room temperature, amount of dust in the dustbin, etc.

Main body

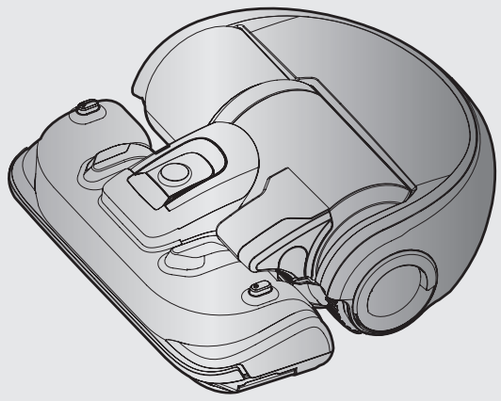


Charger

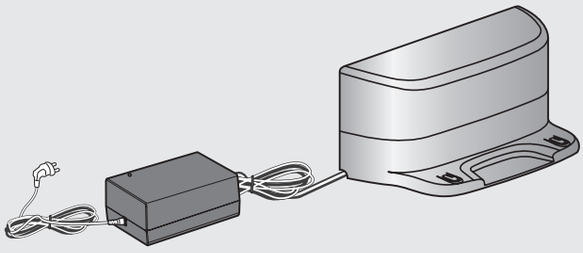


2-3. Components

■ Main body

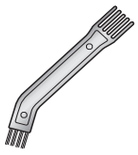


■ Charger station (charger + adapter + power cord)



■ Remote control

■ Basic components

(AAA battery)			
User manual/battery	Quick guide	Filter	Cleaning brush
Virtual guard(Option)			

2-4. Specifications compared to competitors

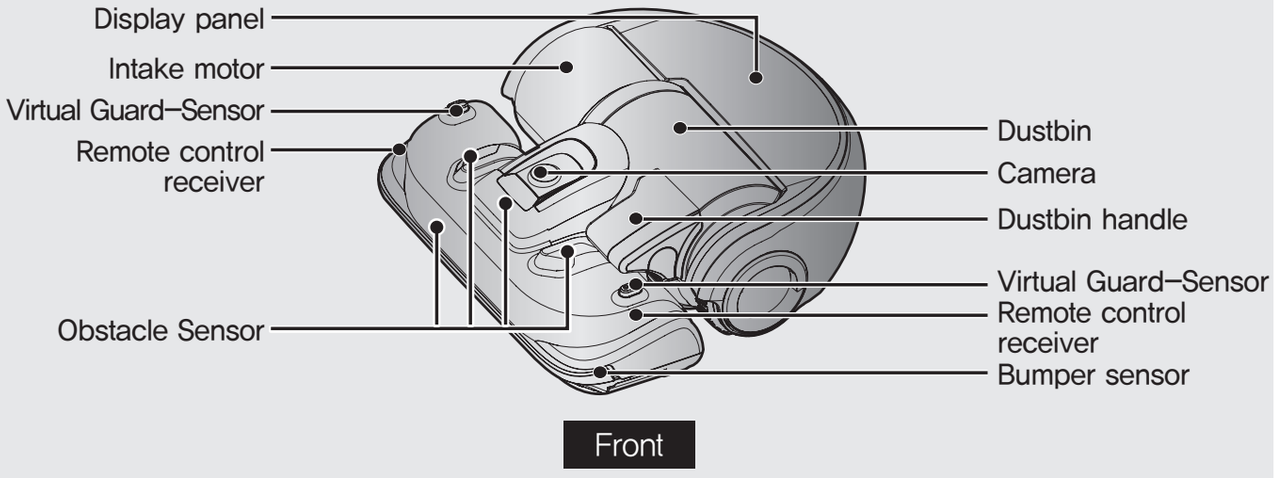
('←': same as to the left)

Model		SAMSUNG	SAMSUNG	SAMSUNG	LG	iRobot
		VR20H9050U*	VR20H9030U*	VR10F71UCAC	VR6371LVM	Roomba 780
Image						
Location recognition method		Vision (Visionary Mapping Plus)	←	←	←	Random
Automatic charging		○	←	←	←	←
Virtual Guard		○ (VIRTUAL GUARD)	←	←	X	Lighthouse
Sensor	Obstacle	○ (avoidance)	←	←	○ (avoidance)	○ (collision)
	Impact (bumper)	○ (MICRO S/W)	←	←	X	○
	Cliff	○	←	←	←	←
	Dustbin sensor	X	←	←	○	←
Empty dustbin		Manual	←	Manual	Manual	Manual
Charging time		160 minutes	←	180 minutes	180 minutes	180 minutes
Usage time		60 min(Standard mode)	←	90 minutes	100 minutes	120 minutes
Cleaning mode		Auto, Spot, Manual, Max One-Time Schedule, Daily Schedule	←	←	Auto, Spot, Manual, Max One-Time Schedule, Daily Schedule	Clean, Spot, Manual Schedule
Remote control		IR remote control	←	←	IR remote control	IR remote control
Add-on		Point cleaning	X	X		

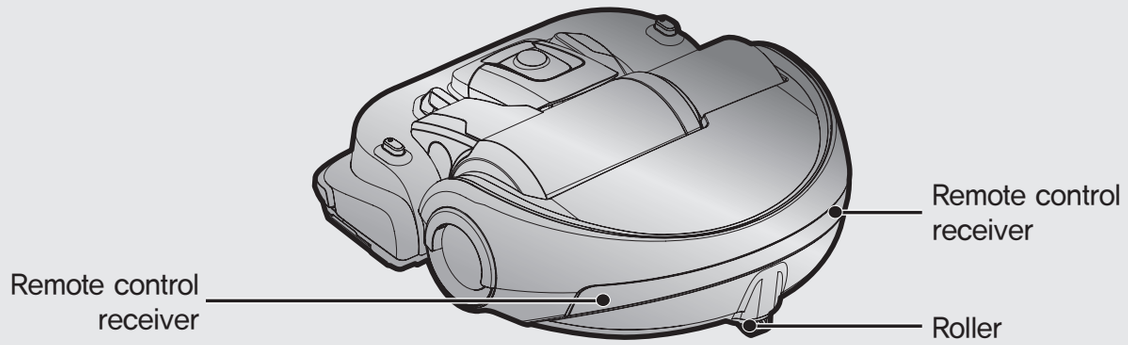
3. Product Functions

3–1. Name of each part

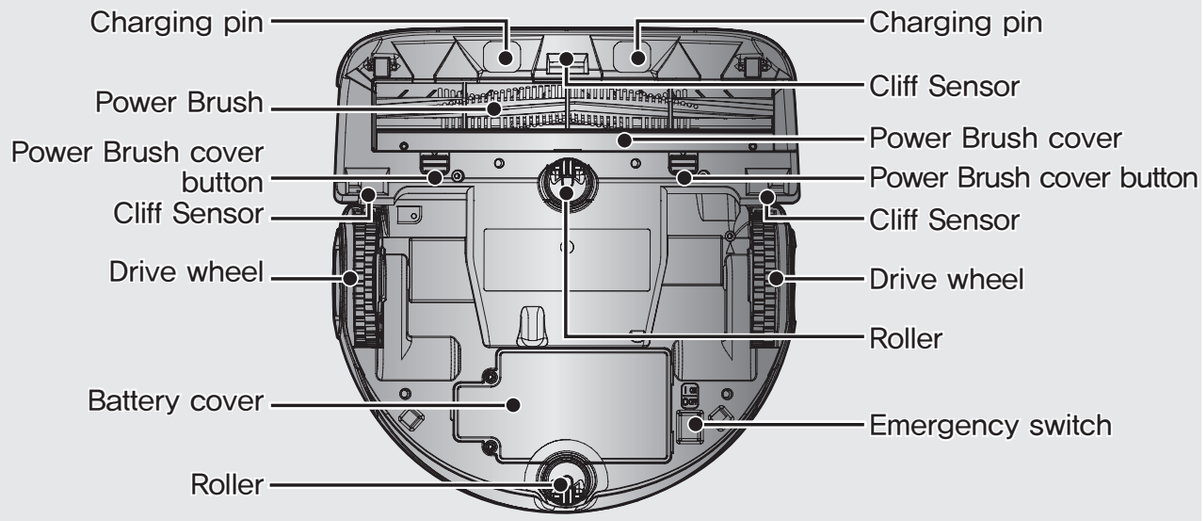
■ Main body



Front

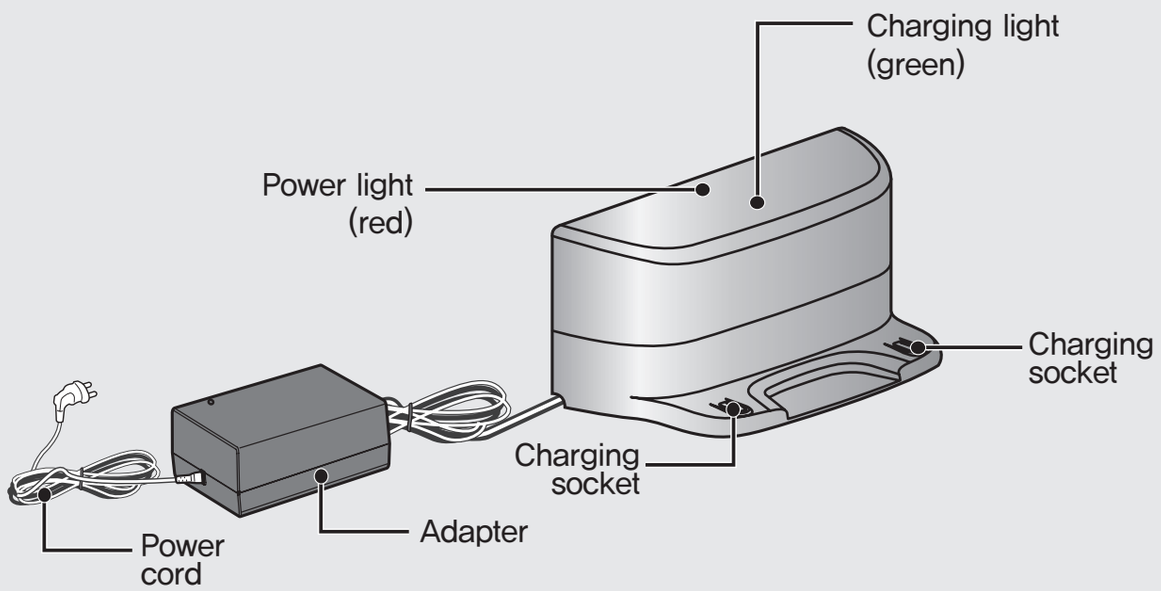


Side

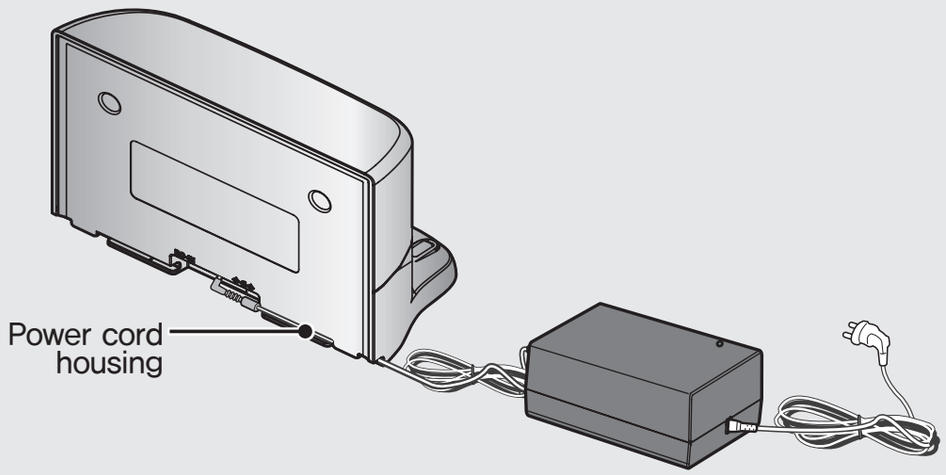


Floor

■ Charger



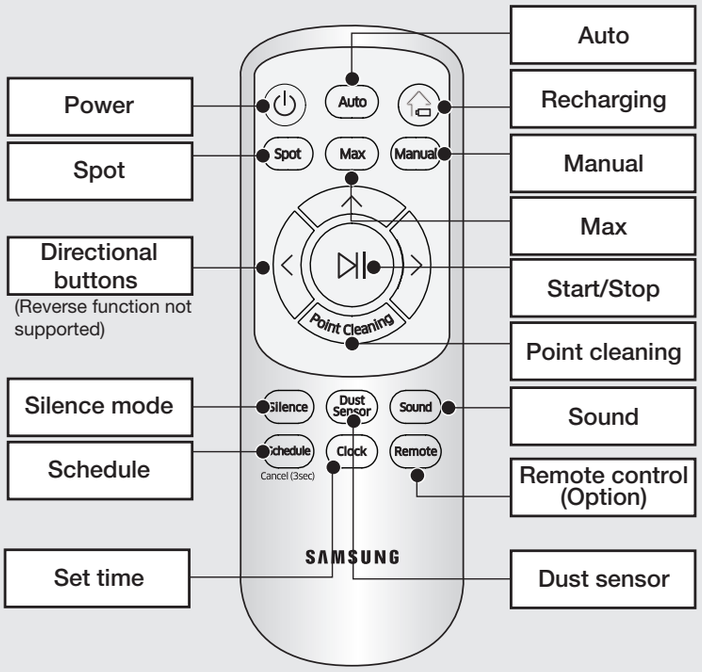
Front



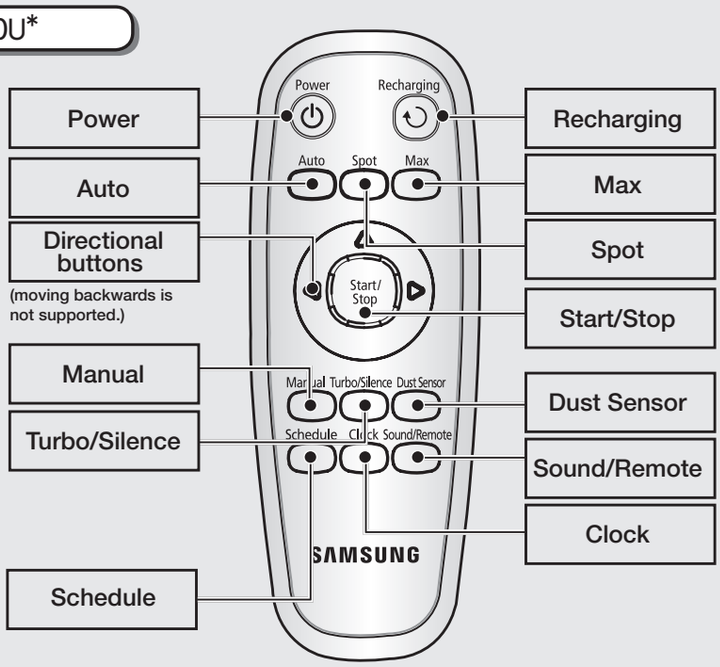
Rear

■ Remote control

VR20H9050U* (with Point Cleaning)

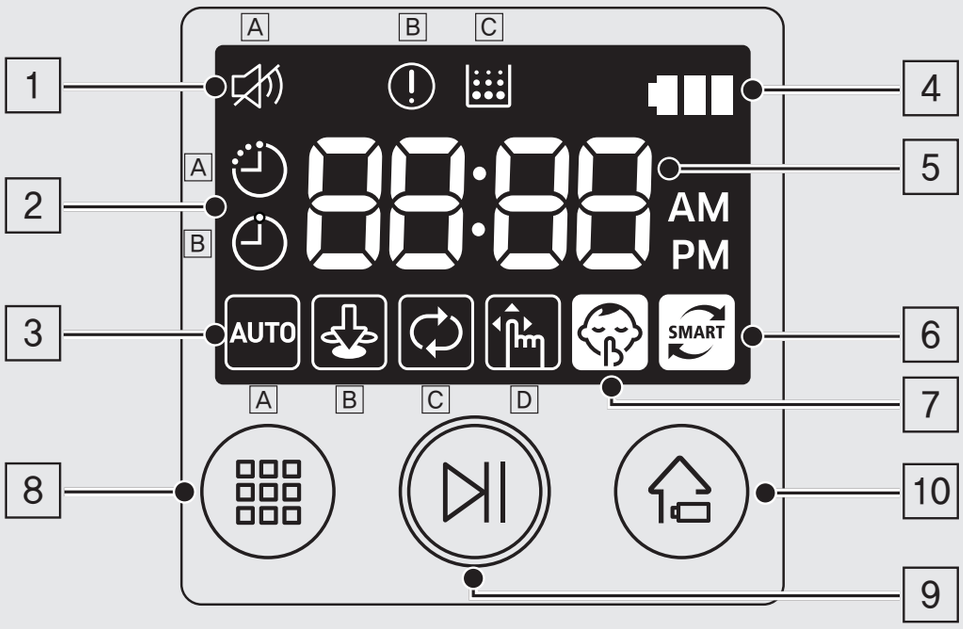


VR20H9030U*



※ Icons may differ according to remote control model.

■ Display panel



Display panel

1. Display panel
- If an option is selected or a particular situation is detected, it will be displayed on the screen.
  ⓐ Mute ⓑ Problem ⓒ Empty dustbin

2. One-time/daily schedule
- This icon is on when One-Time/Daily Schedule is set in order to clean once or daily as desired.
  ⓐ Daily schedule ⓑ One-Time Schedule

3. Cleaning mode display
- When the Cleaning Mode button is pressed, the cleaning modes appear in the following order.
  ⓐ Auto Clean: icon is on during automatic cleaning
  ⓑ Spot Clean: icon is on during spot cleaning
  ⓒ Max Clean: icon is on during repeat cleaning
  ⓓ Manual Clean: icon is on during manual cleaning

4. Battery
- While charging: 3 bars are displayed when charging is complete
- During use: Bars disappear one by one as the battery drains (when it's empty, one bar flickers and "Lo" is displayed).

5. Number display
- Displays the current time/schedule, status, error codes, letters, graphics, etc.

6. Smart Turbo Mode
- The icon turns on when Smart Turbo Mode is selected.

7. Silent Mode
- The icon turns on when Silent Mode is selected.

Buttons

8. Cleaning mode
- Press the ⏯ button to start cleaning after a cleaning mode has been selected.

9. Start/stop
- Start or stop cleaning

10. Recharging
- The recharging display appears while recharging is in progress.

3–2. Explanation of product functions

Category	Item	Information	Details
Cleaning Functions	Cleaning method	Visionary Mapping	Recognizes through Visionary Mapping Plus and moves to clean.
	Cleaning mode	Auto Clean	Automatically cleans and returns to charger.
		Spot Clean	Cleans a set area (about 1.5 m x 1.5 m).
		Max Clean	Moves and cleans until one battery life bar flickers.
		Manual Clean	Move the robot using the remote control to clean the area you want.
	Schedule Functions	One–Time Schedule	Cleans at a set time.
		Daily Schedule	Cleans at a set time every day.
	Cleaning Functions	Smart Turbo	Smart Turbo mode runs when dust entry is detected to temporarily clean that area.
		Silent Mode	Quieter than regular cleaning modes.
		Point Cleaning	Use the remote control's Point Cleaning to move to and clean a desired area.
	Dust collection method	Intake	Takes in dust using an intake motor.
	Main brush	Power Brush	Motor to sweep up dust from the floor.
	Cleaning time	Battery drainage time	The maximum time the robot can move from the time its battery is full to the time it is empty.
Control Functions	Main body button	3 button (touch)	Cleaning Mode, Start/Stop, Return to Charger/Smart Care
	Remote control buttons (Point Cleaning)	17 buttons	Power, Auto Clean, Return to Charger, Spot Clean, Max Clean, Manual Clean, Forward, Left, Right, Start/Stop Point Cleaning, Silent, Smart Turbo, Voice, Schedule, Clock, Remote
	Remote control buttons (regular)	15 buttons	Power, Return to Charger, Auto Clean, Spot Clean, Max Clean, Forward, Left, Right, Start/Stop, Manual Clean Turbo/Silent, Smart Turbo, Schedule/ Daily, Voice Selection, Clock
	Emergency switch	LOCKER	Blocks power to the cleaning robot for safety or during an emergency
Display functions	Main body display	LED module	To show the status of the cleaning robot.
Charging Functions	Charging method	Automatic charging	Automatically returns to the charger when 15% or less of the battery remains
		Manual Clean	User charges manually
	Charging time	Time to full battery	Time until the battery reaches FULL
Sensor Functions	Cliff Sensor	Infrared light sensor	Detects the height difference from the floor (about 5 cm or more)
	Obstacle Sensor	WiLD Sensor	Detects the distance to obstacles in front
	Bumper Sensor	MICRO S/W	Detects bumping
	Drum contamination sensor	Encoder	If the drum motor becomes contaminated, checks that it is not running and stops all functions
	Wheel contamination sensor	Encoder	If the wheel motor becomes contaminated, checks that it is not running and stops all functions

3–3. Product functions

3–3–1. Installing the cleaning robot

■ Order of installation

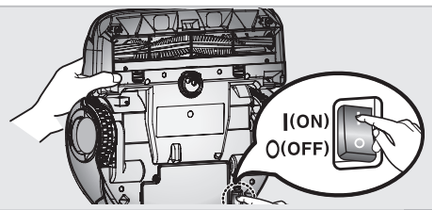
1 Emergency switch on/off
To use the cleaning robot, the emergency switch on the bottom of the main body must be in the on position.

2 Installing the charger
First install the charger in order to charge the cleaning robot. The batteries are not charged by factory default, so please fully charge them before use.

3 Charging
You must charge the batteries first in order to use the cleaning robot.

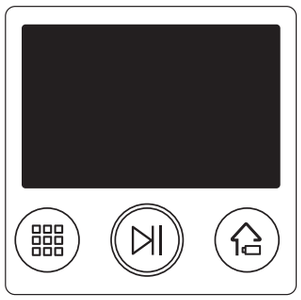
4 Setting the time
Set the current time in order to set up One–Time or Daily Cleaning.

5 Using Virtual guard(Option)
Be sure to use Virtual guard for areas where the cleaning robot cannot go.
(If you need more Virtual guard, please purchase it from a service center.)

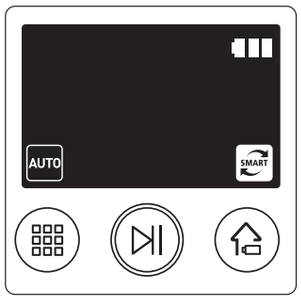


■ Emergency switch on/off

For the cleaning robot to operate, the emergency switch must be in the on position.
If the emergency switch is turned off, all settings will be initialized except for the current time and daily cleaning schedule.



When only the emergency switch has been turned on



When the emergency switch has been turned on and then the ⏯ button on the main body is pressed and held

1 Turn on the rear emergency switch while avoiding pressing any buttons on the main body.

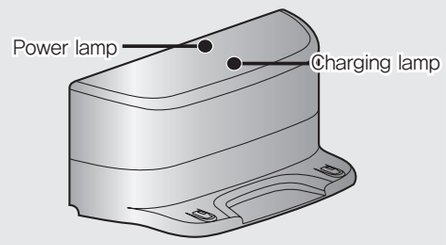
▶ If the icon in the left picture does not appear after turning on the emergency switch and pressing and holding the ⏯ button on the main body, the battery is low. Charge the cleaning robot on the charger with the emergency switch in the on position.

▶ The set time may differ from the current time, so please set the cleaning robot to the correct time.

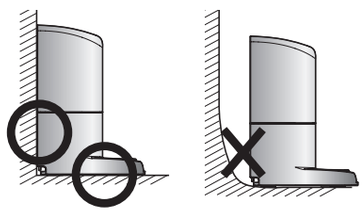
Caution

- If the emergency switch is in the off position, the cleaning robot will not charge even if it is docked on the charger.
- If the cleaning robot is in energy–saving mode, power will not come on even if the emergency switch is turned off and then on. Hold down the ⏯ button on the main body.

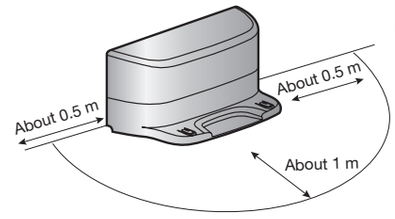
■ Installing the charger



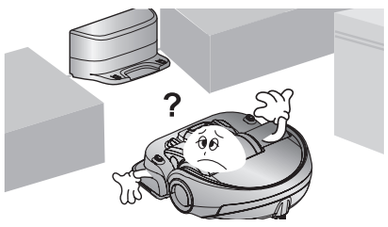
1 Please install in a place where the floor and wall are level.



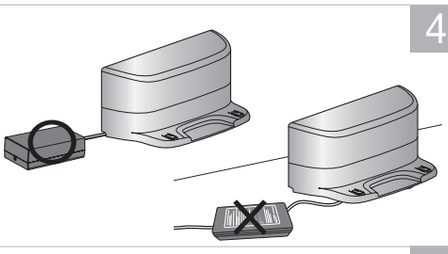
2 Install in a location with no obstacles or areas where there is a risk of falling within 0.5 m of each side and 1 m of the front.



3 Install the charger where the cleaning robot can easily find it.

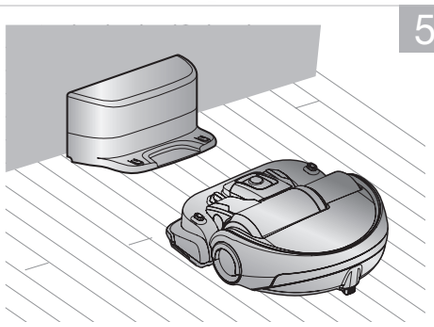


4 Ensure the power cord is arranged neatly next to the wall.



Caution
- When using the adapter, the side with the sticker attached should face downward.

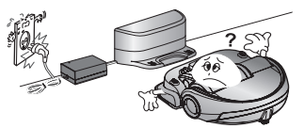
5 It is best to install along the grain of wood floors.



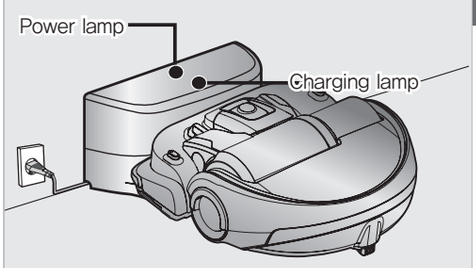
Note

Always plug in the charger's power plug.

- If power is not supplied to the charger, the cleaning robot cannot find it and cannot automatically return to the charger.



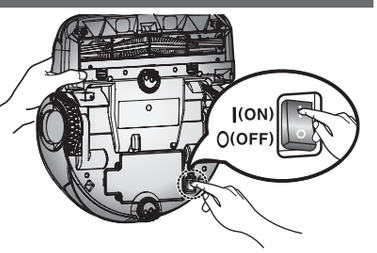
- If the cleaning robot is left detached from the charger, the battery will drain naturally.



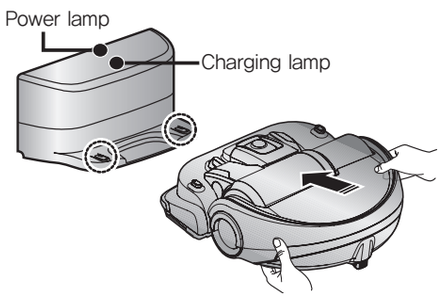
■ Charging

The battery is not charged by factory default, so charging must initially be done manually.

Turn on the emergency switch on the bottom of the main body.



1



When the robot's charging pin is inserted precisely into the charger, push the cleaning robot until you hear "Charging begins" from the cleaning robot. (During Voice mode)

▶ Charger status

– Power lamp [ ]: Charger's power status

→ When the light is on: power ON

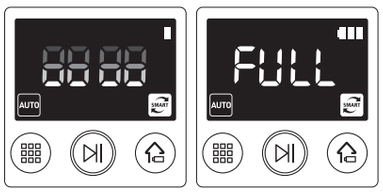
→ When the light is off: power OFF

– Charging lamp [ ]: Charging status

→ When the light is on: charging ON

→ When the light is off: charger OFF

2



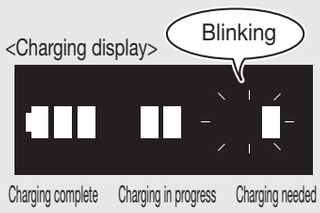
Charging in progress Charging complete

Check the charging status of the cleaning robot.

– If charging has started, " 88:88 " flashes on the Display panel.

– If charging is complete, "**FULL**" flashes on the Display panel.

■ If the remaining battery life display blinks during cleaning, intake stops and the cleaning robot moves to the charger for automatic recharging.

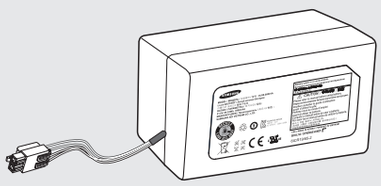


■ **If the cleaning robot does not start cleaning at the charger and cannot find the charger while cleaning, it stops around the area where it first started cleaning.**

■ If "Lo" is displayed while the remaining battery life display is blinking during automatic cleaning, the remote control and main body buttons will also not work, so you must take the cleaning robot to the charger yourself. (When the battery is almost fully drained.)

Note

- It takes about 160 minutes to completely charge when first purchased and can be used for about 60 minutes (standard mode/wood floor).
- If the battery overheats during charging, charging may take longer.
- What to do when charging does not work correctly:
  If automatic charging is not working, please check the items below.
  – Turn the emergency switch on the bottom of the main body off and on again.
  – Plug in the charger's power plug again.
  – Check whether there is any foreign matter in the socket, and dust the main body and charger socket with a dry cloth or dry rag.
  – Check whether there are any reflective objects, chairs, etc. in the vicinity of the charger.
- If the cleaning robot is left detached from the charger, the battery will drain naturally.
  – If possible, keep the cleaning robot on the charger and charged.
  (Turn off the emergency switch when away from home for long periods of time such as business trips, holidays, etc., and leave the charger unplugged.)



■ About the battery

■ This product uses **lithium ion batteries** that do not harm the environment and have an overcharge protection function so they can be used for a long time.

■ Purchase batteries at service centers and check the genuine part symbol (SAMSUNG) and model name before purchasing.

▶ This battery is exclusively for use in Samsung Electronics cleaning robots; do not use it for any other product.

▶ Do not disassemble or repair.

▶ Charge in a well–ventilated location.

▶ Do not expose the battery to fire or to excessive heat.

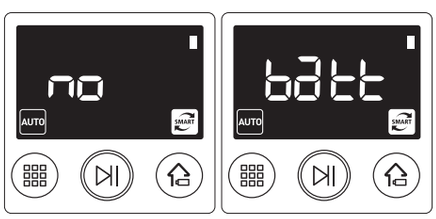
▶ Do not connect the (+) or (–) terminals to metallic objects.

▶ Keep indoors (0℃~40℃)

※ If the battery malfunctions, do not disassemble it yourself; contact your nearest service center.

※ Battery charging time and usage time may decrease the more the battery is used. If the battery's lifespan has been exceeded, have it replaced at a service center.

Battery error codes and steps to take

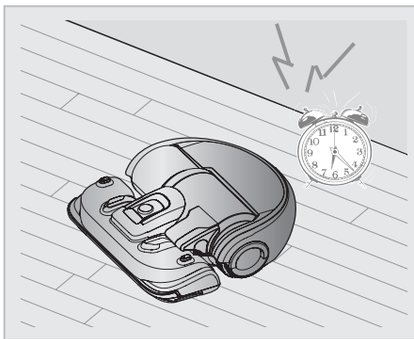


Flashing screen

■ If the no batt screen flashes after inserting the cleaning robot's main body into the charger socket (docking it on the charger), there is a problem with the battery or its wire is disconnected; please contact a local service center.

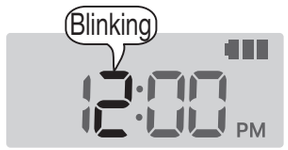
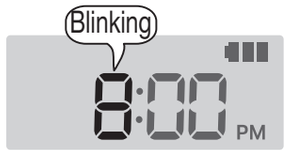
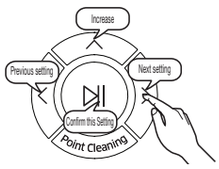
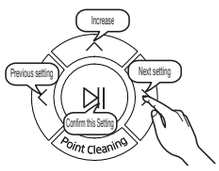
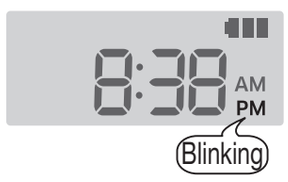
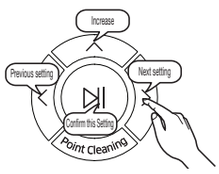
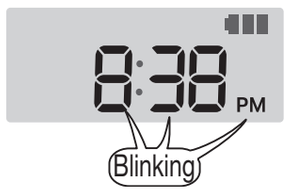
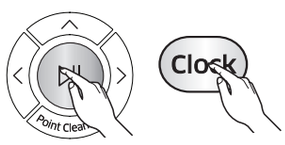
Warnings

- This product has a rated voltage of AC 100–240V.
- Be sure to only use genuine Samsung batteries.

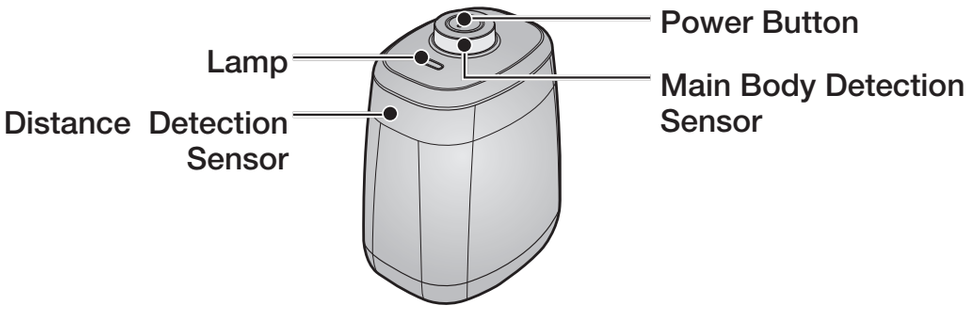


■ Setting the clock

Time must be correctly set initially in order to use the One–Time Schedule and Daily Schedule functions.

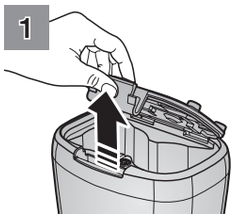
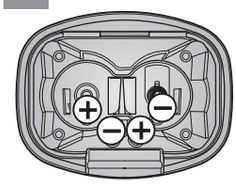
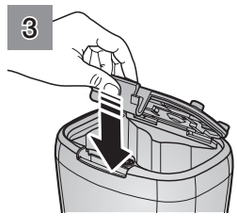
Ex.) If the current time is 08:38 PM	Remote control	Setup order
		1 Press the "Set time" button. – The current time is displayed. ※ If the current time is displayed and there is no input, it will change to standby mode after 1 minute.
		2 Set the hour. – Set the hours with the ⌃ button. – Setup with the ⏯ button complete. – Use the ‹ › left/right buttons to move forward and backward.
		3 Set the minutes. – Set the minutes with the ⌃ button. – Setup with the ⏯ button complete. – Use the ‹ › left/right buttons to move forward and backward.
		4 Set AM/PM. – Set AM/PM with the ⌃ button. – Setup with the ⏯ button complete. – Use the ‹ › left/right buttons to move forward and backward.
		5 Save the time. – Press the ⏯ button and time setup button to save the current time. – Automatically saved after 5 minutes
Cancel setup		Setup is canceled if you press the ⏻ button on the remote control during setup and leave setup mode.
Setup standby time	If 1 minute passes without the time being set, setup mode is exited.	

VIRTUAL GUARD(Option)



Installing the batteries

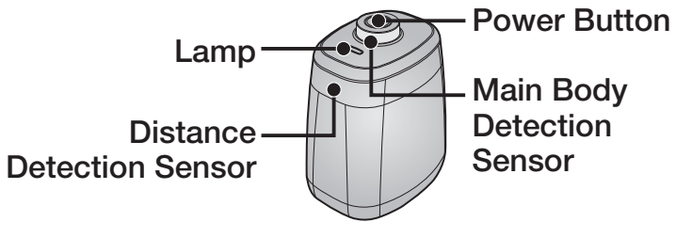
Batteries are not supplied with the product. You have to purchase the batteries separately. Install the batteries (type D) before use.

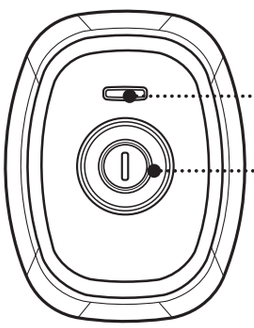
1	2	3
		
Lift the cover of the VIRTUAL GUARD while pressing the locking tab.	Install the batteries into the VIRTUAL GUARD as shown by the figure below. (If the batteries are installed with the incor–rect polarity, the VIRTUAL GUARD will not work.)	After inserting the tip of the cover into the slot, push the other end to close it until it clicks into place.

Specification: Type D (LR20) batteries

Installing the VIRTUAL GUARD(Option)

You can confine the vacuum cleaning robot to a particular section by using Fence (virtual wall) mode.





Button operations

1. Lamp operations

- Fence (virtual wall) Mode: The red lamp flashes.
- Off :The lamp is turned off.

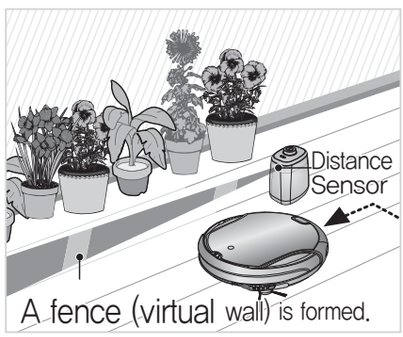
2. Turn the Power Button on

- Whenever you press the Power button, Fence (virtual wall) mode → Power off is selected in this sequence.

※The distance of virtual wall is 2.5m at minimum and may differ depending on surroundings and movement status of the robot.

Forming a Fence (virtual wall)

VIRTUAL GUARD creates an invisible barrier that the vacuum cleaning robot cannot cross.
E.g. in front of pots, furniture, the front door, and so on.



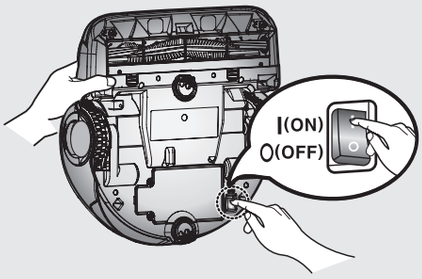
1. Turn the Fence (virtual wall) mode on using the Power button.

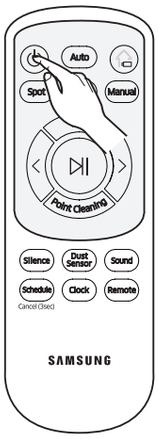
– The mode lamp flashes red.

2. Install the VIRTUAL GUARD in front of the area you want to block access from the vacuum cleaning robot.

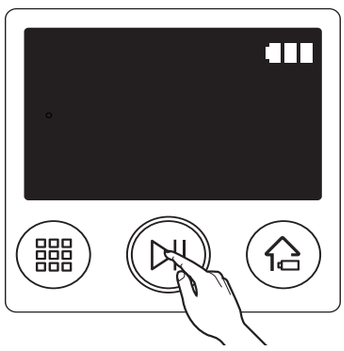
– Install the VIRTUAL GUARD so that the distance detection sensor can form an invisible barrier that the vacuum cleaning robot cannot cross.

3-3-2. Using the cleaning robot

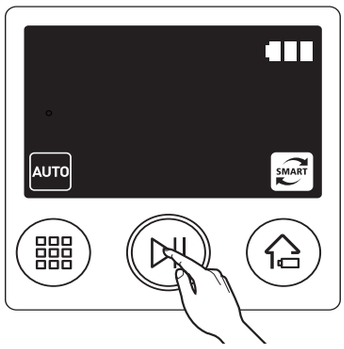




When using the remote control



Standby mode status



When using the main body button

■ Starting/stopping cleaning

All of the cleaning robot's functions can be started or stopped.

When the cleaning robot is operating, press the ⏯ button to cancel and then select your desired function.

Emergency switch on/off

The emergency switch must be on for any of the cleaning robot's functions to operate.

■ Turn on the rear emergency switch while avoiding pressing any buttons on the main body.

Power on/off

On
- Remote control: Press the ⏻ button.
- Main body: Press and hold the ⏯ button.

Off
- Remote control: Press the ⏻ button.
- Main body: Hold down the ⏯ button for 3 seconds or more.

※ Turning the power on/off using the remote control is only possible in Standby mode. In other modes, please press and hold the ⏯ button on the main body to turn on the power.

※ If there is no user input in the On state for about 30 minutes, the power will automatically turn off to reduce battery consumption.
To use again, hold the ⏯ button on the main body.

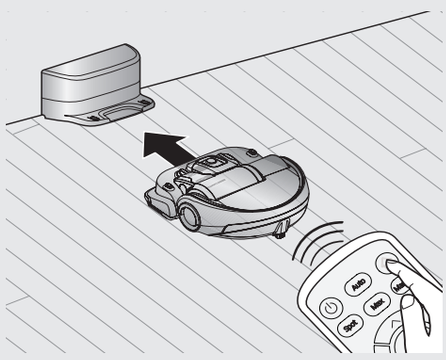
> **Caution** If the cleaning robot is in energy-saving mode, power cannot be turned on by the main body's emergency switch or by the remote control's ⏻ button. Hold down the ⏯ button on the main body.

Starting/stopping cleaning

Start
- Remote control: Press the **Auto Clean, Spot Clean, Max Clean or Manual Clean** buttons.
- Main body: Select **Auto Clean, Spot Clean, Max Clean or Manual Clean** with the ⊞ button and then press the ⏯ button.

▶ If no cleaning mode is selected when the ⏯ button is pressed, Auto Clean will start.

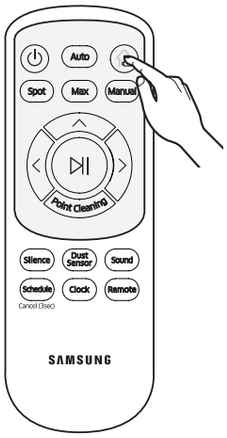
Stop — If the remote control's ⏯ button or the main body's ⏯ button is pressed while cleaning is in progress, the cleaning robot will stop.



■ Returning to the charger

The ⌂ button commands the cleaning robot to return to the charger.

- If the main body's or remote control's ⌂ button is pressed while the cleaning robot is operating, the robot will automatically return to the charger.
- Point cleaning can be used during cleaning.



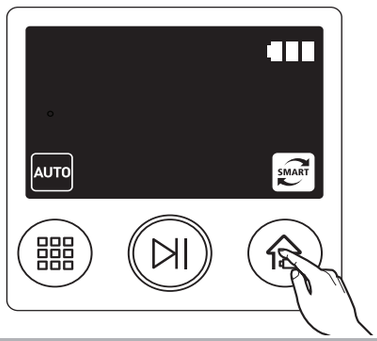
When using the remote control

1 **Press the** Return to Charger button.

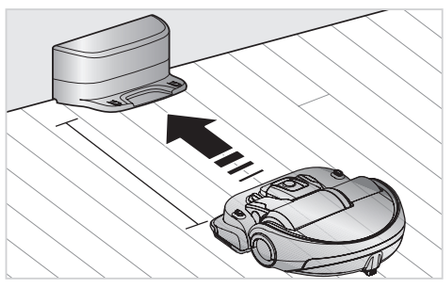
▶ Recharging starts while the display shows " 00:00 "

2 To stop returning to the charger as it is in progress, press the remote control's ⏯ button or the main body's ⏯ button.

3 When testing automatic return to charger, press the ⌂ button 1.5 meters in front of the charger.



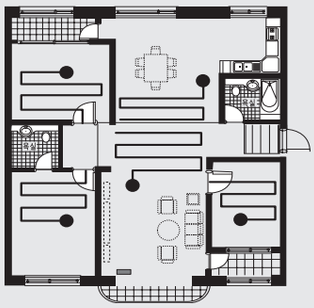
When using the main body button



Steps to take if recharging does not occur

▶ Check the installation of the charger.
- If the charger is in a location to which it cannot guide the robot
- If the distance between the charger and cleaning robot is 5 m or more
  : Returning to the charger may take a long time

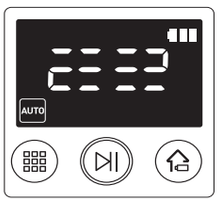
▶ In the following cases, please recharge manually.
- If the charger is installed in a corner
- If the battery is completely drained
- If it is hidden by an obstacle (furniture, etc.)
- If the cleaning robot cannot cross a threshold between itself and the charger (Acceptable threshold heights: about 1.5 cm or less)
- If the battery's remaining charge display is blinking and "Lo" is displayed



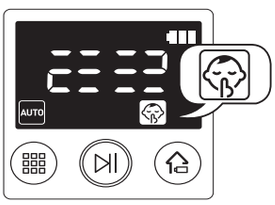
■ Using Auto Clean

Automatically cleans, moving independently until cleaning has finished once.

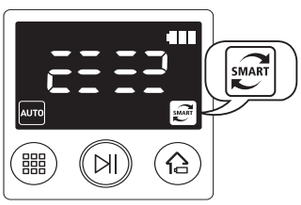
- Auto Clean begins if a cleaning mode is not selected and the main body's ⏯ button or remote control's ⏯ button is pressed.
- If cleaning starts while the cleaning robot is docked on the charger, it remembers its initial location and the time it takes to return to the charger is decreased.
- If cleaning does not start from the charger and the cleaning robot cannot find the charger while cleaning, it may stop near where it first began cleaning.
- If the battery becomes low during cleaning, the cleaning robot will recharge and will finish cleaning the remaining area after recharging. (Repeat cleaning frequency: 1 time)



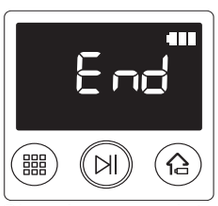
Standard Mode



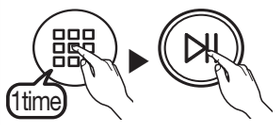
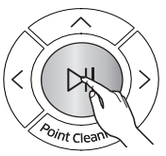
Silent Mode



Smart Turbo



Cleaning complete

Main body button	Remote control	Setup order
		1 Set a mode
		2 Cancel setup

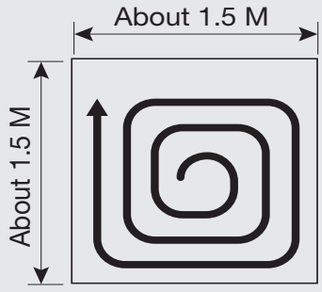
Note

Learning about repeat cleaning

- If the cleaning robot detects that cleaning has completed, it will not clean again.
- If the cleaning robot is moved while in Auto Clean or the cleaning mode is changed, it will detect that cleaning has completed and will not clean again.

Caution

- Do not unnecessarily move the cleaning robot or press buttons while it is cleaning. It assumes that cleaning has completed and starts again from the beginning.
- The Silent icon on the display is turned on or off each time the Silent button is pressed on the remote control, and Silent mode may be used if the Silent icon is on.
- The Smart Turbo icon on the display is turned on or off each time the Smart Turbo button is pressed on the remote control, and Smart Turbo Mode may be used if the Smart Turbo icon is on.



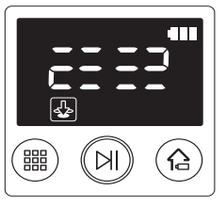
■ Using Spot Clean

This mode allows simple cleaning, for example, when a cookie crumb, etc. is dropped.

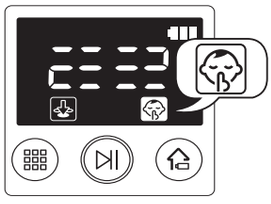
■ Move the cleaning robot to the area you want cleaned.

■ Point cleaning can be used during cleaning.

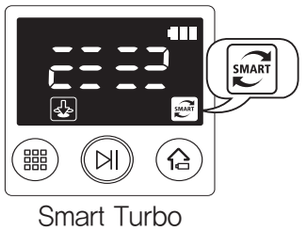
※ When using Point Cleaning during Spot Clean, Spot Clean is restarted from the point where the robot began Point Cleaning.



Standard Mode

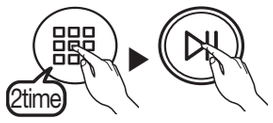
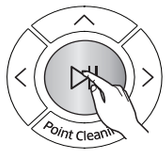


Silent Mode



Smart Turbo

Cleaning complete

Main body button	Remote control	Setup order
		1 Set a mode
		2 Cancel setup

▶ Cleans an area of about 1.5 x 1.5 meters.

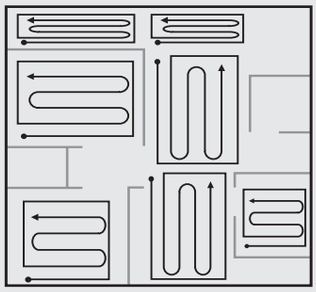
▶ When cleaning is complete, “End” is displayed and the cleaning robot stays where it is and enters standby.

Note

Spot Clean does not work if the cleaning robot is docked on the charger.

Caution

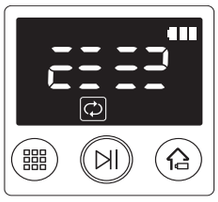
- The Silent icon on the display is turned on or off each time the Silent button is pressed on the remote control, and Silent mode may be used if the Silent icon is on.
- The Smart Turbo icon on the display is turned on or off each time the Smart Turbo button is pressed on the remote control, and Smart Turbo Mode may be used if the Smart Turbo icon is on.



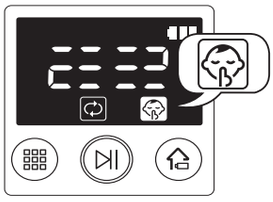
■ Using Max Clean

Even after cleaning is complete, Max Clean is done until just one bar remains on the battery display.

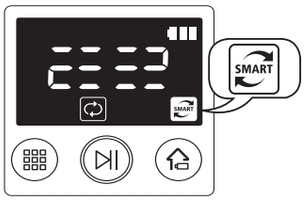
- If cleaning starts while the cleaning robot is docked on the charger, it remembers its initial location and the time it takes to return to the charger is decreased.
- If cleaning does not start from the charger and the cleaning robot cannot find the charger while cleaning, it may stop near where it first began cleaning.
- If the battery becomes low during cleaning, the cleaning robot will recharge and will finish cleaning the remaining area after recharging. (Repeat cleaning frequency: 1 time)
- Point cleaning can be used during cleaning.



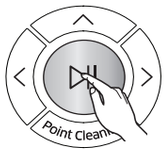
Standard Mode



Silent Mode



Smart Turbo

Main body button	Remote control	Setup order
※Twice while recharging		1 Set a mode
		2 Cancel setup

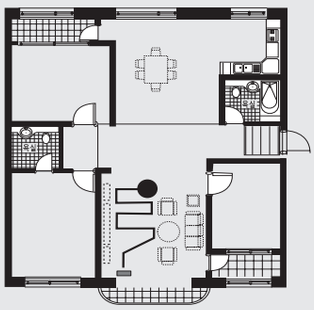
Note

Learning about repeat cleaning

- If the cleaning robot is moved while in Automatic Cleaning or the cleaning mode is changed, it will detect that cleaning has completed and will not clean again.

Caution

- Do not unnecessarily move the cleaning robot or press buttons while it is cleaning. It assumes that cleaning has completed and starts again from the beginning.
- The Silent icon on the display is turned on or off each time the Silent button is pressed on the remote control, and Silent mode may be used if the Silent icon is on.
- The Smart Turbo icon on the display is turned on or off each time the Smart Turbo button is pressed on the remote control, and Smart Turbo Mode may be used if the Smart Turbo icon is on.



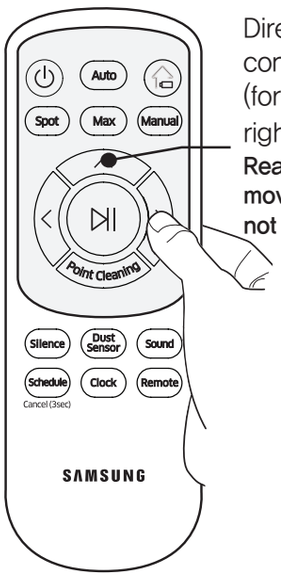
■ Using Manual Clean

You can clean while moving the cleaning robot yourself using the remote control.

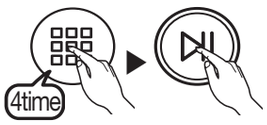
■ Move the cleaning robot to the area you wish to clean.

■ Manual Clean can only be done **with the remote control.**

■ Point cleaning can be used during cleaning.



Directional control (forward, left, right)
Rear movement not supported

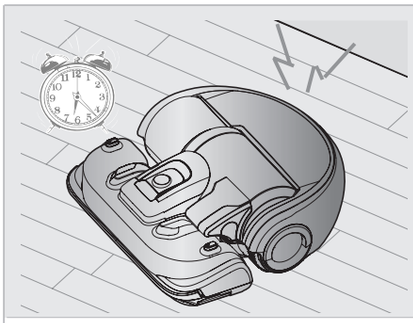
Main body button	Remote control	Setup order
	Manual Clean	1 Set a mode
		2 Cancel setup

Note

- Manual Clean does not work while the cleaning robot is docked on the charger.
- If 1 minute passes with no action after Manual Clean begins, Manual Clean is stopped.

Caution

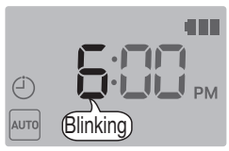
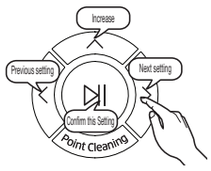
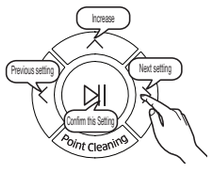
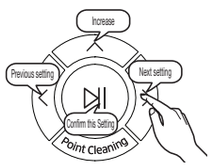
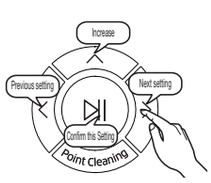
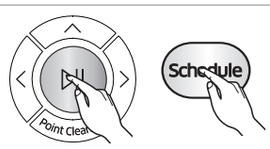
- The Silent icon on the display is turned on or off each time the Silent button is pressed on the remote control, and Silent mode may be used if the Silent icon is on.
- The Smart Turbo icon on the display is turned on or off each time the Smart Turbo button is pressed on the remote control, and Smart Turbo Mode may be used if the Smart Turbo icon is on.

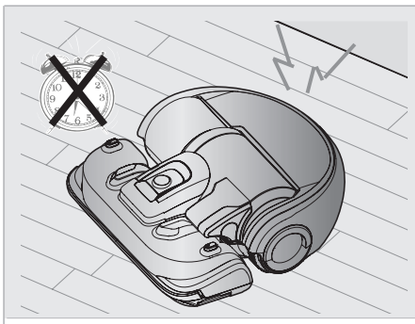


■ Setting up One-Time/Daily Schedule

This cleaning mode sets up cleaning once or daily at a particular time.

- Setting up and scheduling cleaning can only be done while the cleaning robot is docked on the charger.
- If the robot is removed from the charger, One-Time Schedule is canceled.
- If One-Time Schedule is set, other cleaning modes cannot be set.
- Hours are set in units of 1 and minutes in units of 5.

Ex) Assuming cleaning starts at 6:30 PM.	Remote control	Setup order
		1 Press the Scheduling button to set up scheduling/daily. – Use the ⌃ button to set up One-Time or Daily Schedule. ※ Cleaning mode If there is no stored information, 12:00 PM is set automatically.
		2 Set the hour. – Set the hours with the ⌃ button. – Setup with the ⏯ button complete. – Use the ‹ › left/right buttons to move forward and backward.
		3 Set the minutes. – Set the minutes with the ⌃ button. – Setup with the ⏯ button complete. – Use the ‹ › left/right buttons to move forward and backward.
		4 Set AM/PM. – Set AM/PM with the ⌃ button. – Setup with the ⏯ button complete. – Use the ‹ › left/right buttons to move forward and backward.
		5 Set the cleaning mode. – Adjust the cleaning mode with the ⌃ button. – Setup with the ⏯ button complete. – Use the ‹ › left/right buttons to move forward and backward.
		6 Save the time – Press the ⏯ button or Schedule button to save the current time.
Cancel setup		Setup is canceled if you press the ⏻ button on the remote control during setup and leave setup mode.
Setup standby time	If 1 minute passes without the time being set, setup mode is exited.	



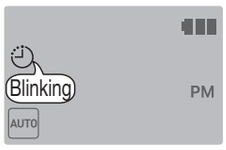
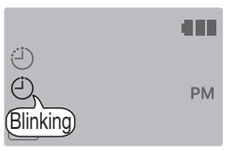
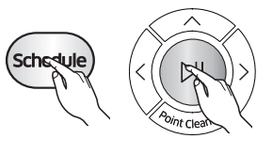
■ Canceling One-Time/Daily Schedule

The set One-Time/Daily Schedule can be canceled.

Ex) Assuming cleaning starts at 6:30 PM.

Canceling only one set One-Time/Daily Schedule

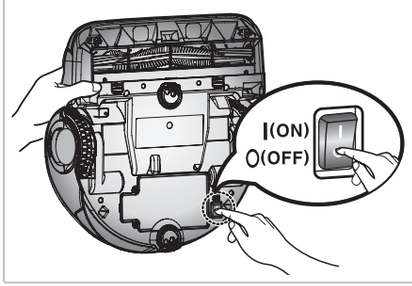
How to cancel just one set One-Time or Daily Schedule.

Remote control	Setup order
	1 Hold down the Timer button for 3 seconds.
	2 Press the ⌒ button to select whether to cancel the One-Time or Daily Schedule mode.
	3 Press the remote control's Schedule button or the main body's ⏯ button.

Canceling One-Time or Daily Schedule

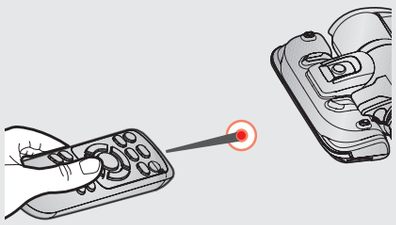
How to cancel One-Time or Daily Schedule if it has been set.

Remote control	Setup order
	1 Hold down the remote control's Timer button for 3 seconds.



Canceling One-Time Schedule setup

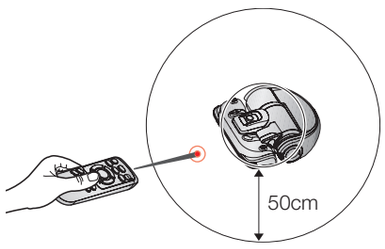
- It is canceled immediately if the cleaning robot becomes detached from the charger.
- Press the remote control's ⏯ button to cancel.
- Press the emergency switch to cancel.
- Press the remote control's ⏯ button to cancel.
- Press the main body's ⏯ button to cancel.



■ USING POINT CLEANING

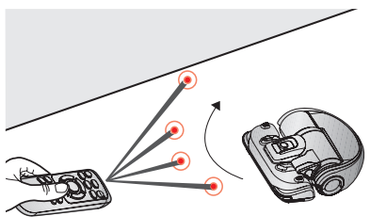
- The Point Cleaning function only works with the remote control, and allows cleaning with direct control of the cleaning robot.
- When stopped after using Point Cleaning within Auto Clean, Spot Clean, or Repeat Clean, the cleaning robot will return to its previous cleaning mode.

※ The Point Cleaning function is only available on applicable models.

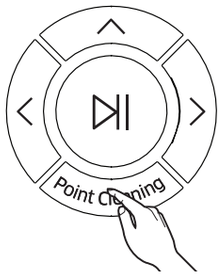


Instructions

1 Point the front of the remote control toward the floor within 50 cm of the robot's location and press the Point Cleaning button to shine a red dot onto the floor.
– If the red dot is shone directly at the main body of the cleaning robot, the cleaning robot may malfunction, so please shine it within 50 cm of the cleaning robot.

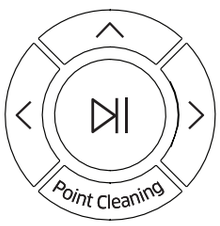


2 Slowly move the red dot in the desired direction while holding down the Point Cleaning button.
The cleaning robot will slowly follow the red dot.



3 If you stop pressing the Point Cleaning button, Point Cleaning will stop.

■ Point Cleaning button pressed
– Mode setup

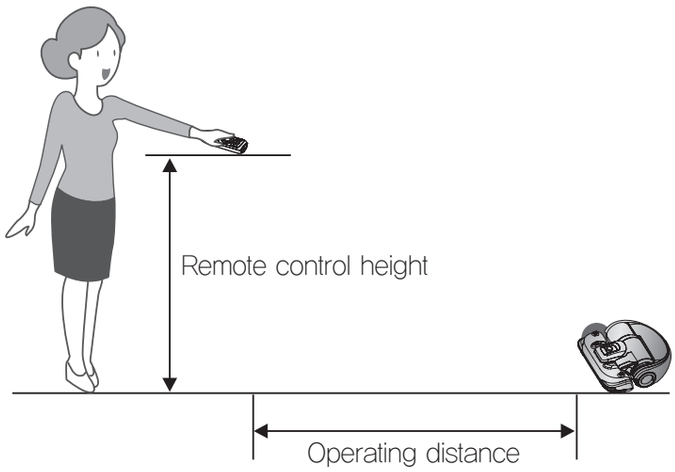


■ Point Cleaning button not pressed
– Setup canceled

Note

- This function only works if the red dot is within 50 cm of the cleaning robot on the floor.
  - The cleaning robot may malfunction if the red dot is shone directly onto its body.
- Malfunctions may occur if used in direct sunlight or under bright lighting.
  - The operating distance of Point Cleaning is reduced on dark floors.

Operating distance by remote control height



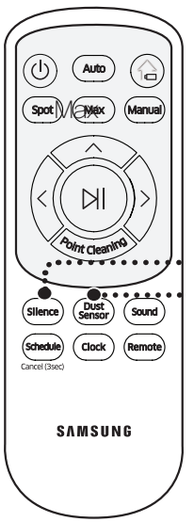
Remote control height	0.5 m	1 m	1.5 m
Operating distance	About 1.5 m	About 2 m	About 3 m

Caution

- Do not shine the red dot onto another person or animal.

■ Using additional functions

Various added functions make the cleaning robot easier and more convenient to use.



Silent Mode

The Silent icon on the display is turned on or off each time the Silent button is pressed on the remote control. **If Silent Mode** is selected, cleaning will take place more quietly than in standard modes. If **Silent Mode** is canceled, cleaning will be done in a standard mode at a standard volume.

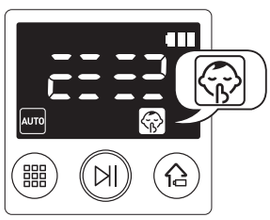
Smart Turbo Mode

The Smart Turbo icon on the display is turned on or off each time the Smart Turbo button is pressed on the remote control.

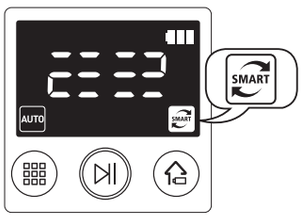
Smart Turbo Mode setup:

- Auto Clean: If dust intake is detected, Smart Turbo Mode runs and the cleaning robot focuses cleaning on that area.
- Spot, Max, Manual Clean: If dust intake is detected, Smart Turbo Mode operates for several seconds.

Smart Turbo Mode is canceled once dust intake is no longer detected. The cleaning robot returns to its set cleaning mode.



Silent Mode

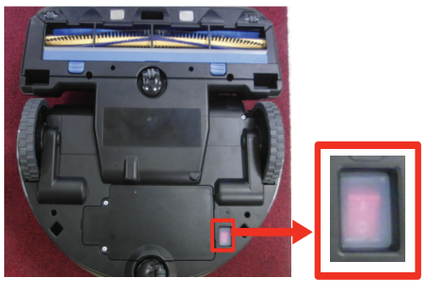


Smart Turbo

4. Assembly and disassembly

4-1. Notes and main tools

▶ Ensure the emergency switch is off while assembling and disassembling.



☞ If assembly or disassembly is done while the emergency switch is on, the circuitry may be damaged. Be sure the emergency switch is off.

Cleaning robot main body
Check the bottom label.

Check the label on the rear of the charger adapter.

▶ When exchanging electrical parts, use only the correct, genuine parts (check labels for model name, rated voltage/current, operating temperature, etc.)
☞ When exchanging chargers, ensure the charger is the correct model to match the robot.

▶ During repairs, harness-type connectors carry no risk of water penetration and make the product durable.
☞ Use only a moderate amount of force.

▶ During repair, completely remove contamination from the housing area, connections and area being maintained.
☞ Prevent tracking, shorts, or other fire risks in advance.

▶ If evidence of water penetration to electrical parts is found: Exchange or tap insulation of electrical parts if water has penetrated.

▶ After repair, check the product's assembly: Keep it the same as it was before repair.
☞ There are a lot of harnesses. During assembly, check the connector assembly once more to confirm that it is correct.

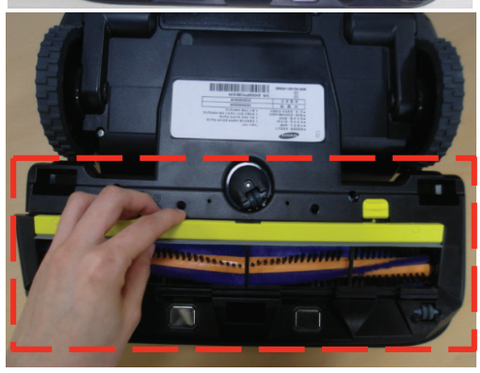
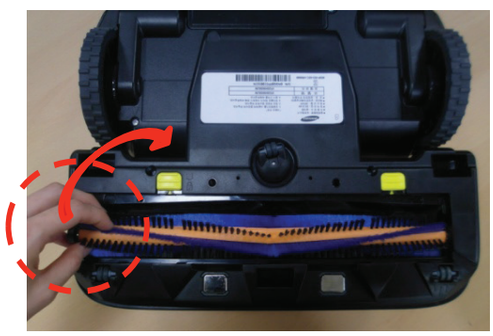
▶ Check the usage environment (the robot cleaner is for household/indoor use): Severe damage may result of the robot is used in prohibited areas.
☞ Prohibited areas: Narrow or detached areas such as attics, basements, warehouses, industrial buildings, wet areas, areas where there is a risk of flame, tabletops, etc.

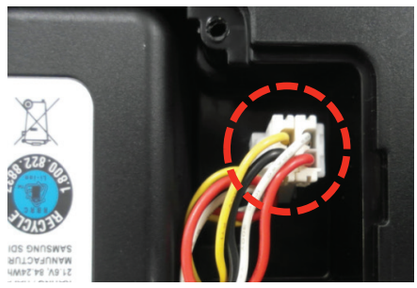
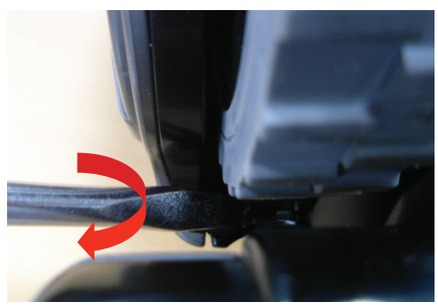
▶ The consumer will not be able to repair the product.

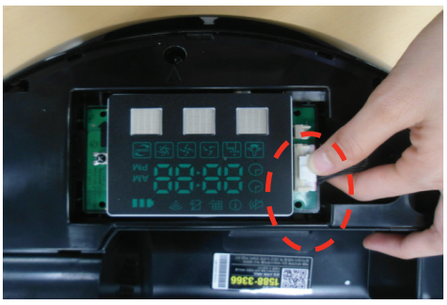
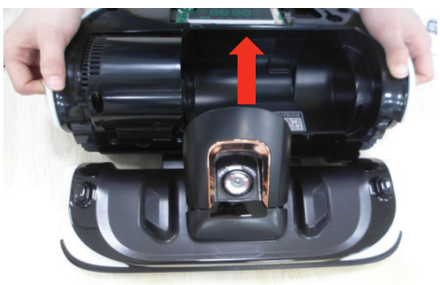
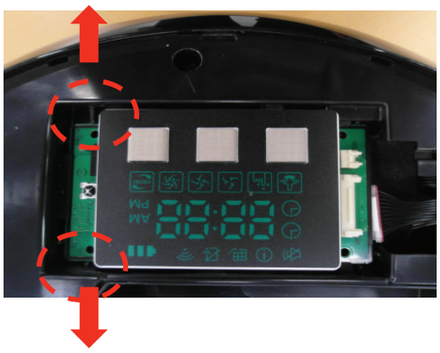
▶ Tools needed during assembly/disassembly: (-) screwdriver, (+) screwdriver

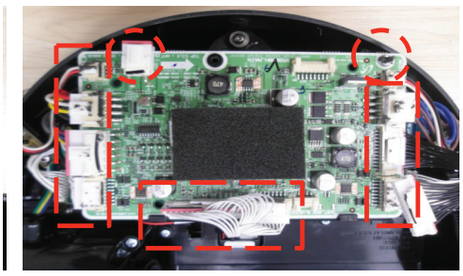
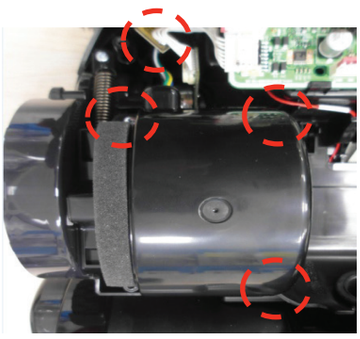
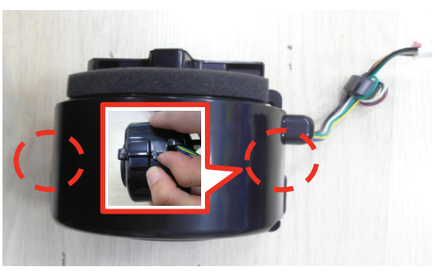
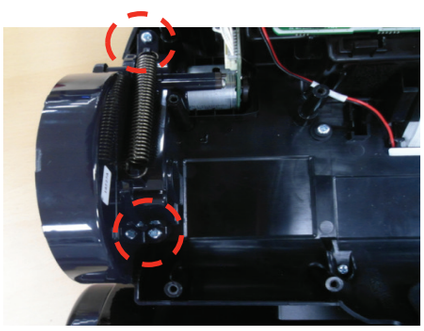
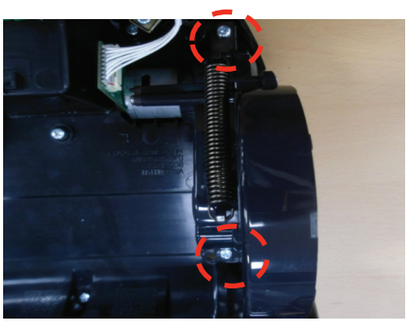
4-2. Main body disassembly method

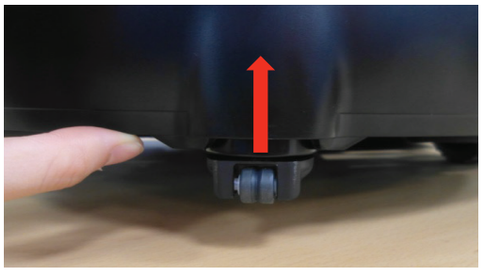
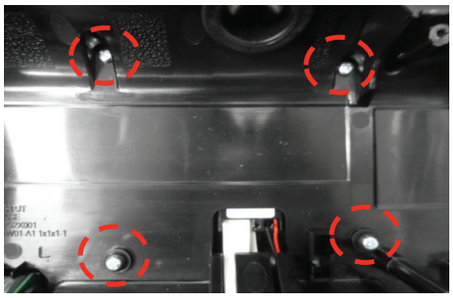
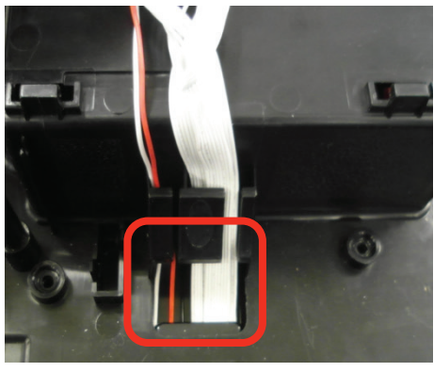
Category	Description	Photo
(1) Main power blocked	Robot overturned and emergency switch off	
(2) Detaching the dustbin (ASSY CYCLONE)	1. Open the dustbin front cover. 2. Hold the dustbin handle and move upward to detach.	

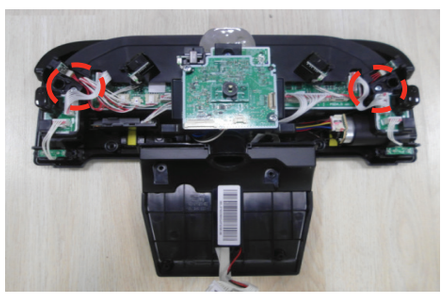
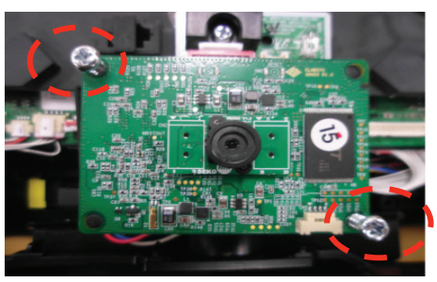
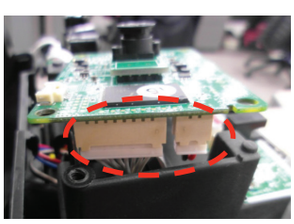
Category	Description	Photo
(3) Detaching the brush cover (ASSY COVER DRUM)	1. Push the brush cover button in the direction of the arrow as in the photo. 2. Move the brush cover upward to detach.	 
(4) Detaching the Power Brush (ASSY DRUM BRUSH)	Lift the Power Brush from the left to detach.	

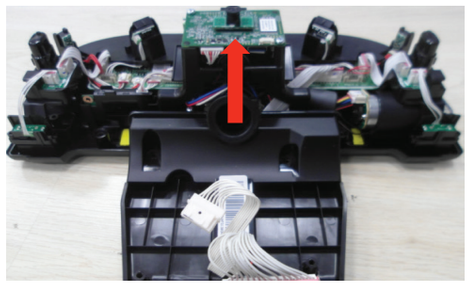
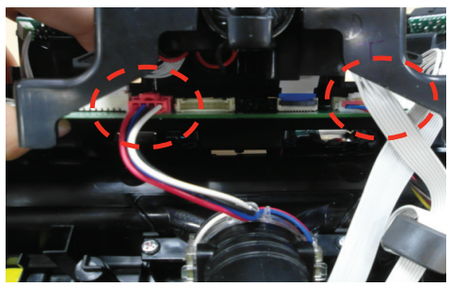
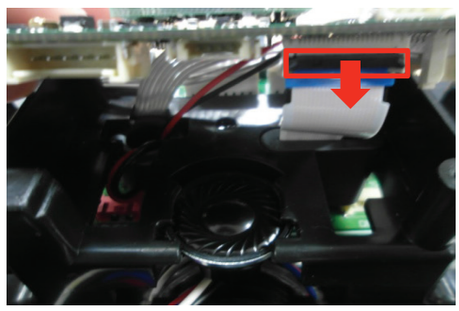
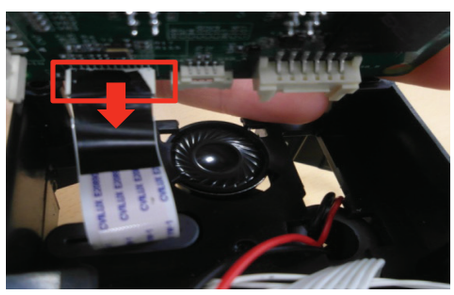
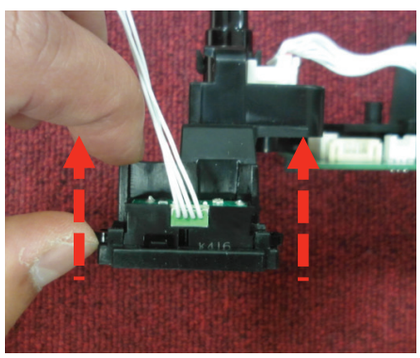
Category	Description	Photo
(5) Removing the battery (ASSY BATTERY)	1. Remove the 2 screws with a (+) screwdriver and detach the battery lid. 2. Lift the battery (ASSY BATTERY) and then detach the connector to the main body.	 
(6) Detaching the intake motor cover (COVER CASE MOTOR)	Use a (–) screwdriver to gently turn and remove the hook, and then hold and lift in the direction of the arrow.	 

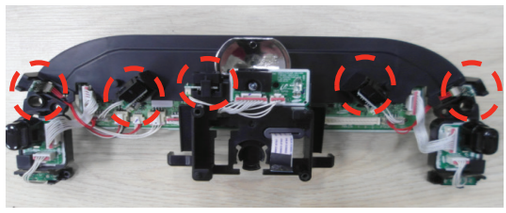
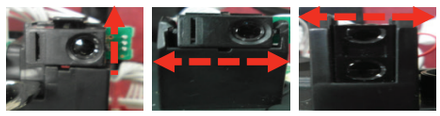
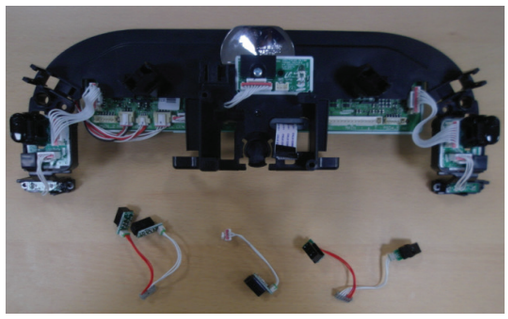
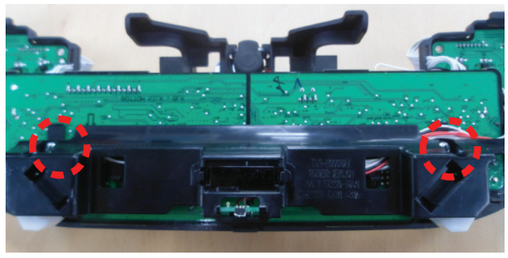
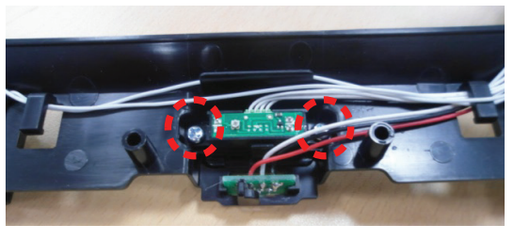
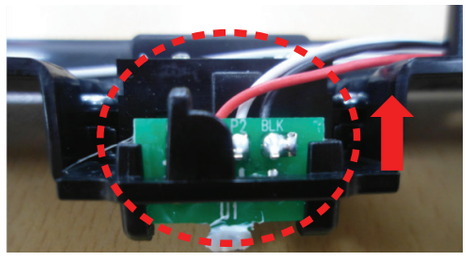
Category	Description	Photo
(7) Detaching the display panel (PANEL CONTROL)	Use a (–) screwdriver to gently turn and remove the latch, and then hold and lift in the direction of the arrow.	
(8) Detaching the BODY MID	1. Remove the 5 screws with a (+) screwdriver and detach the display panel connector. 2. Hold and lift the BODY MID as on the screen.	 
(9) Detaching the ASSY DISPLAY	Push the latch in the direction of the arrow to remove it, and then detach.	

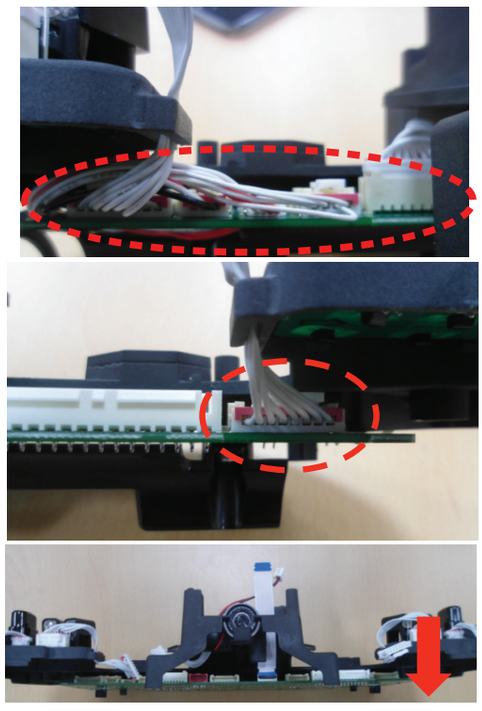
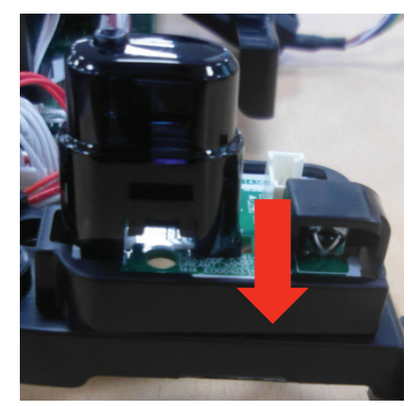
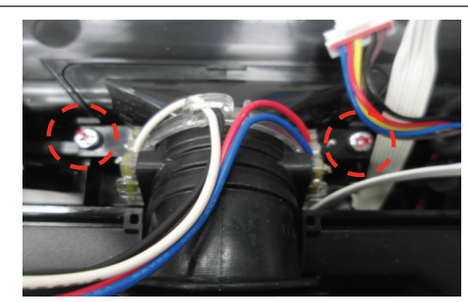
Category	Description	Photo
(10) Detaching the ASSY PCB MAIN	Detach all connectors in the PCB MAIN and then use a (+) screwdriver to remove 1 screw and detach the PCB MAIN.	
(11) Detaching the intake motor (ASSY FAN MOTOR)	1. Remove the 4 screws with a (+) screwdriver and detach the ASSY FAN MOTOR from the BODY BASE. 2. Remove the latch as in the picture, then remove the MOTOR CASE, and then detach the intake motor.	 
(12) Detaching the ASSY WHEEL	Use a (+) screwdriver to remove the 2 screws in order as in the picture and detach the ASSY WHEEL. ※ LEFT, RIGHT joint items	 

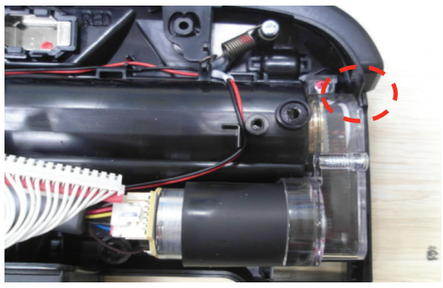
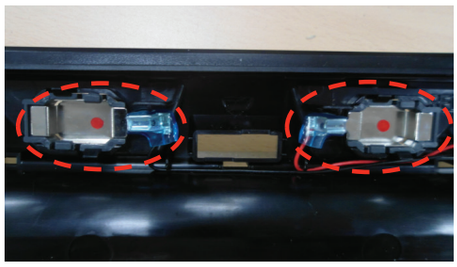
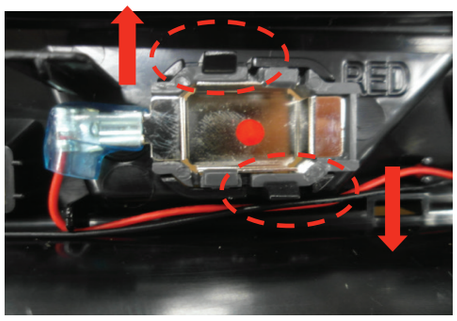
Category	Description	Photo
(13) Detaching the WIRE HARNESS MAIN SWITCH	Use a (+) screwdriver to remove the 2 screws and detach the WIRE HARNESS MAIN SWITCH.	
(14) Detaching the ASSY CASTER	1. Use a (+) screwdriver to remove the 2 screws. 2. Hold and lift the body base in the direction of the arrows in the picture to detach.	 
(15) Detaching the BODY BASE	1. Use a (+) screwdriver to remove the 4 screws. 2. Pull the wire connector through the hole as in the photo to detach the BODY BASE.	 

Category	Description	Photo
(16) Detaching the ASSY COVER BRUSH	1. Use a (+) screwdriver to remove the 4 screws. 2. Detach the COVER BRUSH in the direction shown in the picture.	
(17) Detaching the ASSY CASE SENSOR	1. Use a (+) screwdriver to remove the 2 screws. 2. While holding up the ASSY CASE SENSOR in the direction shown in the picture, completely remove the connector as in the picture and detach the ASSY CASE SENSOR. ※ Use only 12mm screw not 16mm screw	  

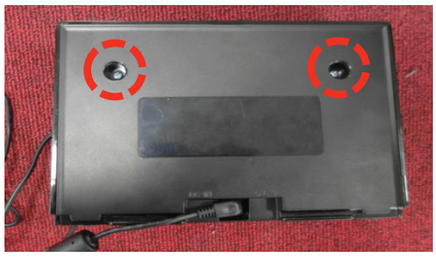
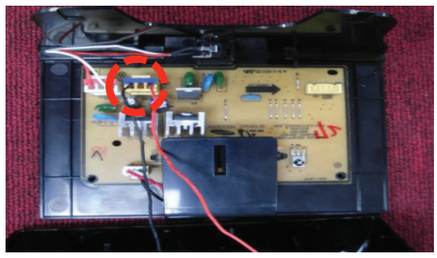
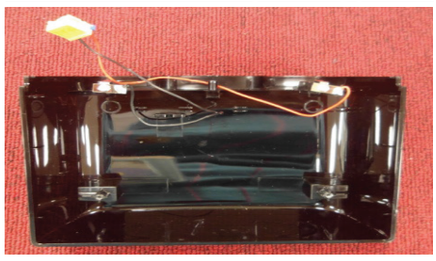
Category	Description	Photo
(18) Detaching the ASSY CASE SENSOR	1. Lift the ASSY CASE SENSOR as indicated in the picture. 2. Remove the connectors from the PCB. 3. Lift the ASSY PCB as indicated in the picture and then remove the sticker behind the connector.	   
(19) Detaching the Cliff Sensor (SENSOR DISTANCE)	Remove the Cliff Sensor (SENSOR DISTANCE) connector and then raise the sensor's latch in the direction of the arrows in the picture to detach.	

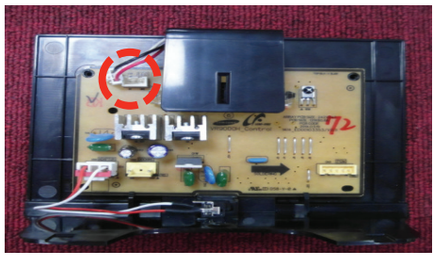
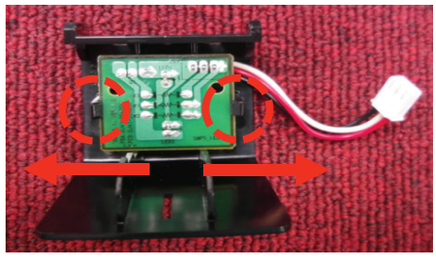
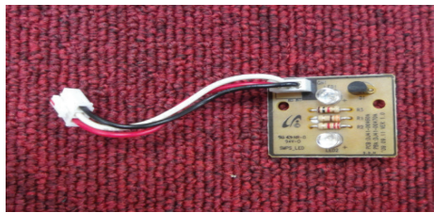
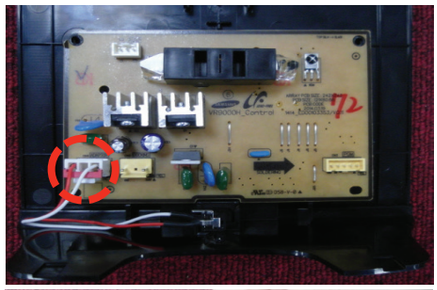
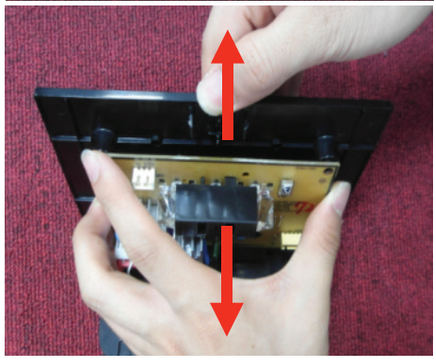
Category	Description	Photo
(20) Detaching obstacle sensor	Remove the sensor psd pushing the hook in direcion of the picture and then remove all the connectors.	  
(21) Detaching the HOLDER SENSOR	Use a (+) screwdriver to remove the 2 screws.	
(22) Detaching the Cliff sensor (sensor distance), Wire harness sensor	Use a (+) screwdriver to remove the 2 screws and push them in the direction of the arrow.	 

Category	Description	Photo
(23) Detaching the SENSOR BOARD	Remove all the connectors from the SENSOR BOARD and then push the board in the direction of the arrow.	
(24) Detaching the ASSY PCB SUB (L.R)	Push the SUB in the direction of the arrow.	
(25) Detaching the DUCT INLET	Use a (+) screwdriver to remove the 2 screws.	

Category	Description	Photo
(26) Detaching the ASSY CASE DRUM	Use a (+) screwdriver to remove the 1 screw.	
(27) Detaching the charging pins (ASSY PLATE)	Push the charging pin latch in the direction of the arrows as in the picture to detach.	 

4–3. Charger assembly/disassembly

Category	Description	Photo
(1) Detaching the BODY CHARGER and COVER CHARGER FRONT	1. Use a screwdriver to remove the 2 screws from the back and 1 screw from the bottom of the charger to detach. 2. Detach the connector as in the picture.	  

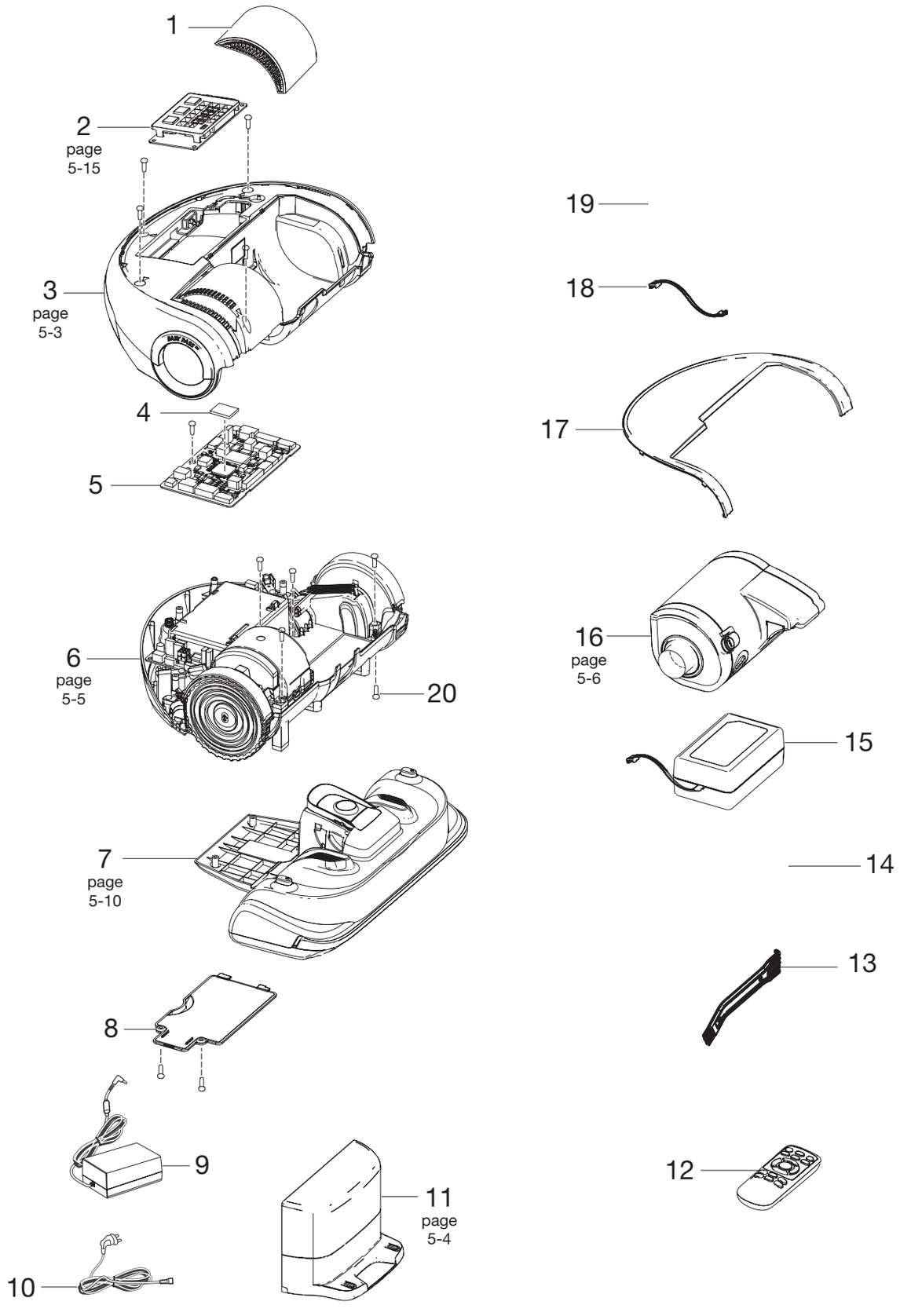
Category	Description	Photo
(2) Detaching the ASSY PCB SUB –1	1. Detach the connector as in the picture. 2. Push the HOLDER PBA latch as in the picture to detach. 3. Push the ASSY PCB SUB latch as in the picture 4. in the direction of the arrow to detach the ASSY PCB SUB.	  
(3) Detaching the ASSY PCB SUB –2	1. Detach the connector as in the picture. 2. Detach the BODY CHARGER and ASSY PCB SUB in the direction of the arrow as in the picture.	 

4-4. Virtual Guard Disassembly & Assembly(Option)

Category	Description	Photo
(1) BATTERY	1. Open the COVER BATTERY and remove the batteries.	
(2) PBA VIRTUAL GUARD	1. Remove the screws (5ea) on the CASE SMART LOW. 2. Remove the WINDOW SMART. 3. Disconnect the PBA Virtual Guard and detach it. 4. Remove the screws (4ea) on the PBA Virtual Guard.	❶ ❷ ❸ ❹

5. Product plan and material list

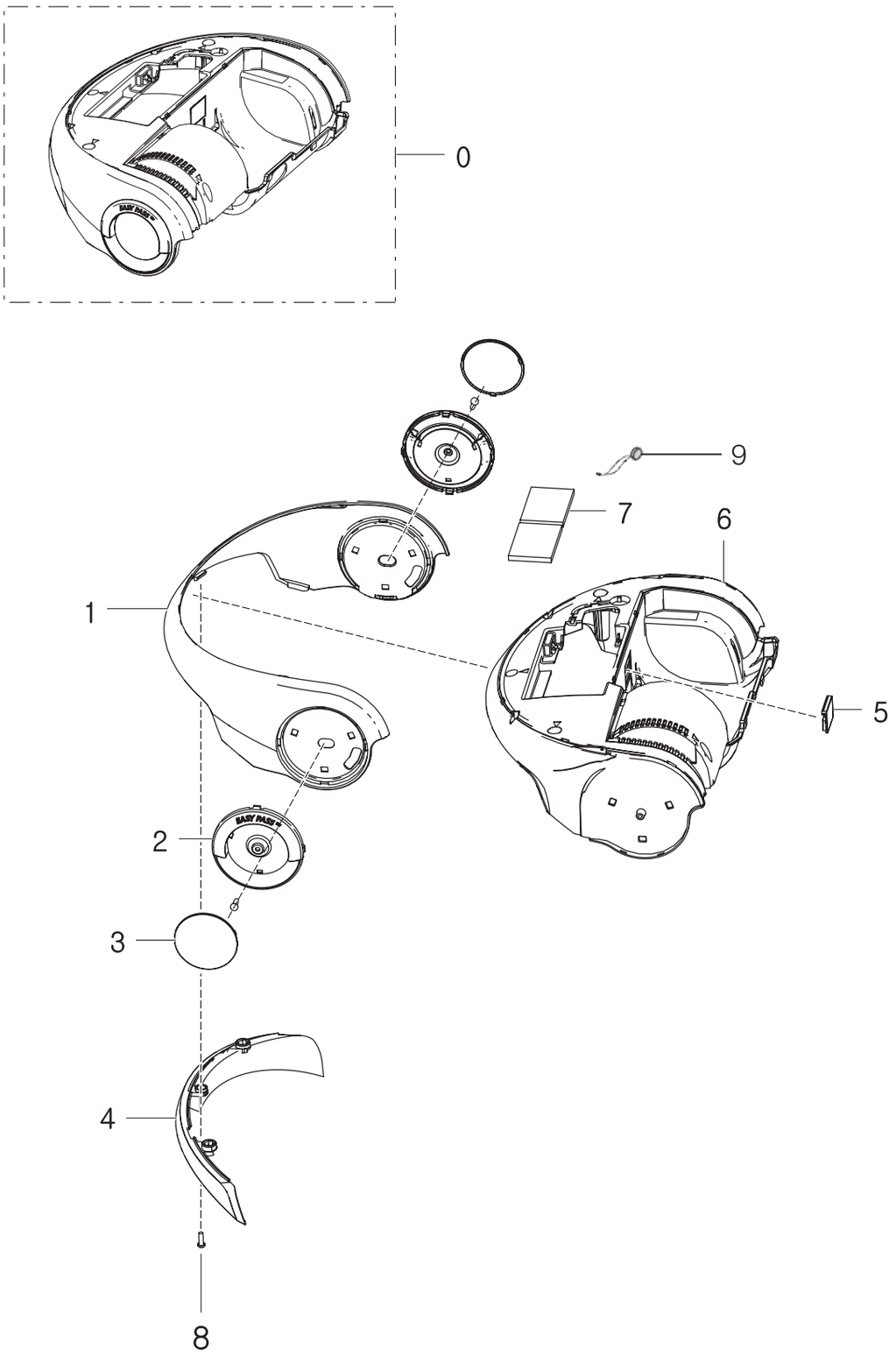
5–1. Assy Body



Part number	Material code	Part name	Specifications	Quantity	Service Has or does not have	Other
1	DJ94-00394A	ASSY PRINTING	VR9000H,COPPER,ROBOT ASSY PRINTING	1	SNA	
	DJ94-00394B		VR9000H,BLUE,ROBOT ASSY PRINTING CASE MOTOR	1	SNA	
	DJ94-00394C		VR9000H,AIRBORNE SILVER,EXP,COVER CASE MOTOR PRINTING	1	SNA	
2	DJ97-02181A	ASSY HOLDER DISPLAY	VR9000H,VR9000H ASSY HOLDER DISPLAY	1	SA	
3	DJ97-02180C	ASSY BODY MID	VR9000H,-,-,ASSY BODY MID EXPORT	1	SNA	
	DJ97-02180D		VR9000H,-,-,EXP DEEP BLUE	1	SNA	
4	DJ63-00508D	FILTER SAFETY	SC6500,PU FOAM,T10,W50,L35,BLK,NON FLAMMABLE	1	SA	
5	DJ92-00134B	ASSY PCB MAIN	PBA MAIN,VR9000H,160X97,DC 21.6V,Yes	1	SNA	
6	DJ97-02295A	ASSY BODY BASE	VR9200J,VR9200J ASSY BODY BASE	1	SNA	
7	DJ97-02175C	ASSY BRUSH	VR9000H,-,-,EXPORT	1	SNA	
	DJ97-02175D		VR9000H,-,-,EXP,DEEP BLUE	1	SNA	
	DJ97-02175F		VR9000H,-,-,DOM,AIRBORNE PLATINUM	1	SNA	
8	DJ63-01424A	COVER BATTERY	VR9000H,PC,-,HB,BLACK,3022R	1	SA	
9	DJ44-00003A	ADAPTOR	VR9000H,24.6V,2.5A,100~240Vac,50/60Hz,60W,SMPS,145 x 67 x 36,BLK	1	SA	
10	3903-000526	CBF-POWER CORD	DT,KS,CP2,250V,2.5A,BLK,1500mm,HV03VVH2-F 0.75mm^2 2C,KS	1	SA	
11	DJ96-00192B	ASSY CHARGER	VR9000H,ASSY CHARGER	1	SA	
12	DJ96-00191B	ASSY REMOCON	VR9000H,VR9000H ASSY REMOCON EXPORT	1	SA	
	DJ96-00114Z		SR8950,EBONY BLK	1	SA	
13	DJ98-01002A	ASSY ACCESSORY BROOM	VC-RE70V,BROOM,BLK,ABS	1	SA	
14	DJ97-00635C	ASSY MAGNET	VR9000H,VR9000H ASSY MAGNET, MAGNET-ROLL 1EA	1	SA	
15	DJ96-00193B	ASSY BATTERY	21.6V,Li-ion,6S2P,130*80*50,KC/UN/UL/CB	1	SA	
16	DJ97-02170C	ASSY CYCLONE	VR9200J,ROBOT CYCLONE	1	SA	
17	DJ64-01212B	PANEL CONTROL	VR9200J,ABS+PMMA,SF-0505H,DARK GLASS	1	SA	
18	DJ39-00254A	WIRE HARNESS-PBA	12,SMH200-12H/WHT,SMH200-12H/WHT,BLK80mm,RIBBON CABLE,-,-,UL1061,26,VR9000H,ASSY MODEL PROCESS,ASSY,12,2,2,-,-,-,-,-,-,BLK	1	SNA	
19	4301-000103	BATTERY-ALKALINE	1.5V,750mAH,LR03,10.2x44.2mm,AAA,12g	2	SNA	
20	6003-000171	SCREW-TAPTYPE	PH,+,NO,B,M4,L16,ZPC(WHT),SWRCH18A	12	SNA	

※ SA = serviceable material/SNA = unserviceable material

5-2. Assy Body Mid



Part number	Material code	Part name	Specifications	Quantity	Service Has or does not have	Other
0	DJ97-02180C	ASSY BODY MID	VR9000H,-,-,ASSY BODY MID EXPORT	1	SNA	
	DJ97-02180D		VR9000H,-,-,EXP DEEP BLUE	1	SNA	
1	DJ64-01215A	DECORATION WHEEL	VR9000H,ABS,-,AIRBORNE	1	SNA	
	DJ64-01215B		VR9000H,ABS,-,Deep Blue	1	SNA	
2	DJ63-01437A	COVER HOLDER	VR9000H,ABS,-,HB,EBONY BLACK,HG-0760GP	2	SNA	
	DJ63-01437B		VR9000H,ABS,-,HB,AZURE BLUE,HG-0760GP	2	SNA	
3	DJ67-00735A	CAP WHEEL	VR9000H,ABS,-,HB,HG-0760GP,AIRBORNE	2	SNA	
	DJ67-00735B	CAP WHEEL	VR9000H,ABS,-,-,HG-0760GP,Deep Blue	2	SNA	
4	DJ64-01208A	WINDOW SENSOR	VR9000H,PC,3022R,DARK GLASS	1	SNA	
5	DJ67-00734A	CAP COVER	VR9000H,TPE,-,-,5252SP,EBONY BLACK,-	1	SNA	
6	DJ61-02232A	BODY MID	VR9000H,ABS,-,EBONY BLACK,HB,HG-0760GP	1	SNA	
7	DJ72-00332D	SPONGE-PCB	SR8897(JAPAN),SPONGE,T5,W30,L30,TOSHIBA,NONFLAMMABLE,BLK	2	SA	
8	6003-000170	SCREW-TAPTYPE	PH,+,-,B,M4,L12,ZPC(WHT),SWRCH18A,-	3	SNA	
9	DJ97-01427B	ASSY BUZZER	VC-RM52V,BUZZER/110mm/SMH200-02H	1	SA	

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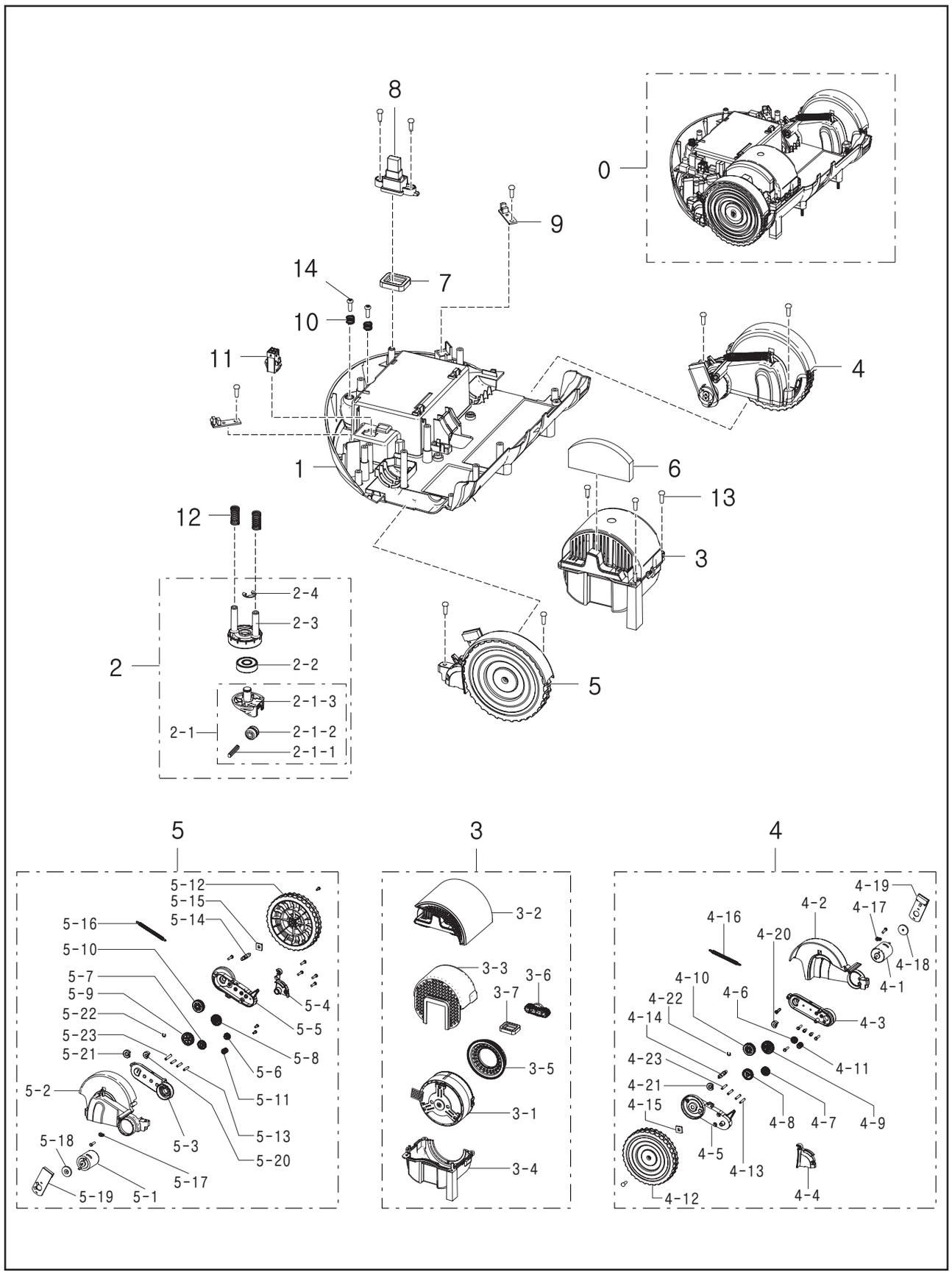
5-3. Assy Body Base



Part number	Material code	Part name	Specifications	Quantity	Service Has or does not have	Other
0	DJ97-02171A	ASSY BODY BASE	VR9000H,VR9000H ASSY BODY BASE	1	SNA	
1	DJ61-02252A	BODY BASE	VR9000H,ABS,-,EBONY BLACK,-,HG-0760GP	1	SA	
2	DJ97-02184A	ASSY CASTER	VR9000H,ROBOT ASSY CASTER	1	SA	
2-1	DJ97-02183A	ASSY ROLLER CASTER	VR9000H,ROBOT ASSY ROLLER CASTER	1	SA	
2-1-1	DJ66-50143A	SHAFT ROLLER	VC-BRUSH,PA66,L20.4,OD4,NTR	2	SNA	
2-1-2	DJ66-70163A	ASSY ROLLER BRUSH	BRUSH,VC6200,SUB GRY,OD12/W9.4/ID4.0,POM,PVC	2	SA	
2-1-3	DJ97-02182A	ASSY HOLDER ROLLER	VR9000H,ROBOT ASSY HOLDER ROLLER	1	SNA	
2-2	6601-002678	BEARING BALL	608ZZ Z3V3,ID8,OD22,L7,ZZ (DOUBLE METAL SHIELD),BALL	1	SNA	
2-3	DJ61-02235A	HOLDER ABSORBER	VR9000H,POM,-,BLACK,-,K300 1	1	SNA	
2-4	6044-000298	RING-E	ID7.0,OD14,T0.8,BLUING(BLK),ST	1	SNA	
3	DJ97-02187A	ASSY FAN SUCTION	VR9000H,ASSY BLDC MOTOR	1	SA	
3-1	DJ31-00147A	MOTOR BLDC FAN	VCM-065CLDA,20000,21.6V,65W	1	SNA	
3-2	DJ61-02253A	CASE MOTOR-UP	VR9000H,ABS,-,EBONY BLACK,-,HG-0760GP	1	SNA	
3-3	DJ61-02254A	CASE MOTOR-MIDDLE	VR9000H,ABS,-,EBONY BLACK,-,HG-0760GP	1	SNA	
3-4	DJ61-02255A	CASE MOTOR-LOW	VR9000H,ABS,-,EBONY BLACK,-,HG-0760GP	1	SNA	
3-5	DJ63-01439A	CUSHION MOTOR	VR9000H,NBR,OD:71 ,ID:28,50,BLACK	1	SNA	
3-6	DJ63-01440A	CUSHION RING	VR9000H,NBR,46,14,45,BLACK	1	SNA	
3-7	DJ63-01446A	FILTER AIR	VR9000H,PU,BLACK,60PPI,PU FOAM	1	SNA	
4	DJ97-02188A	ASSY WHEEL-LEFT	VR9000H,ASSY WHEEL DRIVING L	1	SA	
4-1	DJ31-00149A	MOTOR DC DRIVE	RS360-ST-13310,8700,0.072KGCM,21.6V,0.4,10W,WHEEL	1	SNA	
4-2	DJ61-02230A	CASE WHEEL-LEFT	VR9000H,PC,-,BLACK,V2,3022R	1	SNA	
4-3	DJ61-02231A	BASE GEAR BOX-LEFT	VR9000H,PC,BLACK,V2,3022R	1	SNA	
4-4	DJ63-01421A	COVER WHEEL-LEFT	VR9000H,PC,-,V2,BLACK,3022R	1	SNA	
4-5	DJ63-01422A	COVER GEAR BOX-LEFT	VR9000H,PC,-,V2,BLACK,3022R	1	SNA	
4-6	DJ66-00729A	GEAR A	VR9000H,POM,NATURAL,-,K-300	1	SNA	
4-7	DJ66-00594A	GEAR-A H	AUTOBOT,PBT,0.4,35,NTR,OD16.1,HELICAL, 2-STEP	1	SNA	
4-8	DJ66-00523A	GEAR-B	VC-RA84V,POM,NTR,OD19.9	1	SNA	
4-9	DJ66-00533A	GEAR-DRUM	VC-RA84V,POM,NATURAL,K-300	1	SNA	
4-10	DJ66-00532A	GEAR-MIDDLE DRUM	VC-RA84V,POM,NATURAL,K-300	1	SNA	
4-11	DJ66-00728A	GEAR PINION	VR9000H,POM,NATURAL,-,K300	1	SNA	
4-12	DJ97-02186A	ASSY WHEEL	VR9000H,ASSY WHEEL(TIRE)	1	SA	
4-13	DJ66-00545A	SHAFT-GEAR BOX A	VC-RA84V,STAINLESS-STS304,L15.3,OD3.0,HRC40-50	3	SNA	
4-14	DJ66-00546A	SHAFT-GEAR BOX B	VC-RA84V,SUM24L,L28,OD6,HRC40-50	1	SNA	
4-15	DJ61-02258A	FIXER SHAFT	VR9000H,CR-SPCC,T2.0,-,-	1	SNA	
4-16	DJ61-02273A	SPRING ETC COIL	VR9000H,HSWR,CD0.8,ID5.7,OD7.3,L50,N11.75	1	SNA	
4-17	DJ61-01912A	MAGNET-FERRITE WHEEL	VC-RM84V,MAGNET,W6.1,L10.1,H5.3	1	SNA	
4-18	DJ61-01747A	MAGNET-FERRITE	VC-RA84V,MAGNET,T3.5,W19,L19,MAGNETIC POLE 24	1	SNA	
4-19	DJ39-00254E	WIRE HARNESS-PBA	8PIN,08PAE-28S_HF,08KR06H-P,WHT80,UL1061,26,VR9000H,MAIN-WHEEL,8WIRES,2,2	1	SNA	
4-20	6601-002357	BEARING-OILLESS	ID4.5,OD12,L5.2,SBF1218,WHEEL GEARBOX	1	SNA	
4-21	6601-002356	BEARING-OILLESS	ID6,OD13,L3.9,SBF1218,WHEEL GEARBOX	1	SNA	
4-22	6044-001949	RING-C	ID4.75,OD6.99,T0.6,NTR,SK-5	1	SNA	
4-23	DJ66-00739A	SHAFT GEAR BOX	VR9000H,STAINLESS-STS304,	1	SNA	
5	DJ97-02185A	ASSY WHEEL-RIGHT	VR9000H,ASSY WHEEL DRIV	1	SA	
5-1	DJ31-00149A	MOTOR DC DRIVE	RS360-ST-13310,8700,0.072KGCM,21.6V,0.4,10W,WHEEL	1	SNA	
5-2	DJ61-02228A	CASE WHEEL-RIGHT	VR9000H,PC,-,BLACK,V2,3022R	5	SNA	
5-3	DJ61-02229A	BASE GEAR BOX-RIGHT	VR9000H,PC,BLACK,V2,3022R	1	SNA	
5-4	DJ63-01419A	COVER WHEEL-RIGHT	VR9000H,PC,-,V2,BLACK	1	SNA	
5-5	DJ63-01420A	COVER GEAR BOX-RIGHT	VR9000H,PC,-,V2	1	SNA	
5-6	DJ66-00729A	GEAR A	VR9000H,POM,NATURAL,-,K-300	1	SNA	
5-7	DJ66-00594A	GEAR-A H	AUTOBOT,PBT,0.4,35,NTR,OD16.1	1	SNA	

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Part number	Material code	Part name	Specifications	Quantity	Service Has or does not have	Other
5-8	DJ66-00523A	GEAR-B	VC-RA84V,POM,NTR,OD19.9	1	SNA	
5-9	DJ66-00533A	GEAR-DRUM	VC-RA84V,POM,NATURAL,K-300	1	SNA	
5-10	DJ66-00532A	GEAR-MIDDLE DRUM	VC-RA84V,POM,NATURAL,K-300	1	SNA	
5-11	DJ66-00728A	GEAR PINION	VR9000H,POM,NATURAL,-,K300	1	SNA	
5-12	DJ97-02186A	ASSY WHEEL	VR9000H,ASSY WHEEL(TIRE)	1	SNA	
5-13	DJ66-00545A	SHAFT-GEAR BOX A	VC-RA84V,STAINLESS-STS304,L15.3,OD3.0,HRC40-50	3	SNA	
5-14	DJ66-00546A	SHAFT-GEAR BOX B	VC-RA84V,SUM24L,L28,OD6,HRC40-50	1	SNA	
5-15	DJ61-02258A	FIXER SHAFT	VR9000H,CR-SPCC,T2.0,-,-	1	SNA	
5-16	DJ61-02273A	SPRING ETC COIL	VR9000H,HSWR,CD0.8,ID5.7,OD7.3,L50,N11.75	1	SNA	
5-17	DJ61-01912A	MAGNET-FERRITE WHEEL	VC-RM84V,MAGNET,W6.1,L10.1,H5.3	1	SNA	
5-18	DJ61-01747A	MAGNET-FERRITE	VC-RA84V,MAGNET,T3.5,W19,L19,MAGNETIC POLE 24	1	SNA	
5-19	DJ39-00254K	WIRE HARNESS-PBA	8PIN,08PAE-28S_HF,08KR06H-P,WHT80,UL1061,26,VR9000H,MAIN-WHEEL,8WIRES,2,2	1	SNA	
5-20	6601-002357	BEARING-OILLESS	ID4.5,OD12,L5.2,SBF1218,WHEEL GEARBOX	1	SNA	
5-21	6601-002356	BEARING-OILLESS	ID6,OD13,L3.9,SBF1218,WHEEL GEARBOX	1	SNA	
5-22	6044-001949	RING-C	ID4.75,OD6.99,T0.6,NTR,SK-5	1	SNA	
5-23	DJ66-00739A	SHAFT GEAR BOX	VR9000H,STAINLESS-STS304,L17,OD3.0,NATURAL,HRC40-50	1	SNA	
6	DJ63-01445A	FILTER AIR	VR9000H,PU,BLACK,80PPI,PU FOAM	1	SNA	
7	DJ61-01955A	CAP-SWITCH	VC-RM84V,SILICON,TRP	1	SA	
8	DJ97-02197A	ASSY BUTTON SWITCH	VR9000H,BODYBASE	1	SA	
9	DJ41-00464A	PBA-RECEIVER REAR	AUTOBOT,10X32.8,N	2	SA	
10	DJ61-02277A	SPRING ETC COIL	VR9000H,HSWR,CD0.8,ID 8.0,OD9.6,L7.0,N1.5	2	SNA	
11	DJ39-00255A	WIRE HARNESS-POWER	4,YH396-04V,WHT,177908-1,WHT,60mm,UL1569,18,VR9000H,MAIN-BATTERY,4,2,2	1	SNA	
12	DJ61-02272A	SPRING ETC COIL	VR9000H,HSWR,CD0.5,ID9.5	2	SNA	
13	6002-001279	SCREW-TAPPING	PWH,+,1,M4,L12,PASS,STS430	2	SNA	
14	6003-000170	SCREW-TAPTYPE	PH,+,-,B,M4,L12,ZPC(WHT),SWRCH18A,-	11	SNA	

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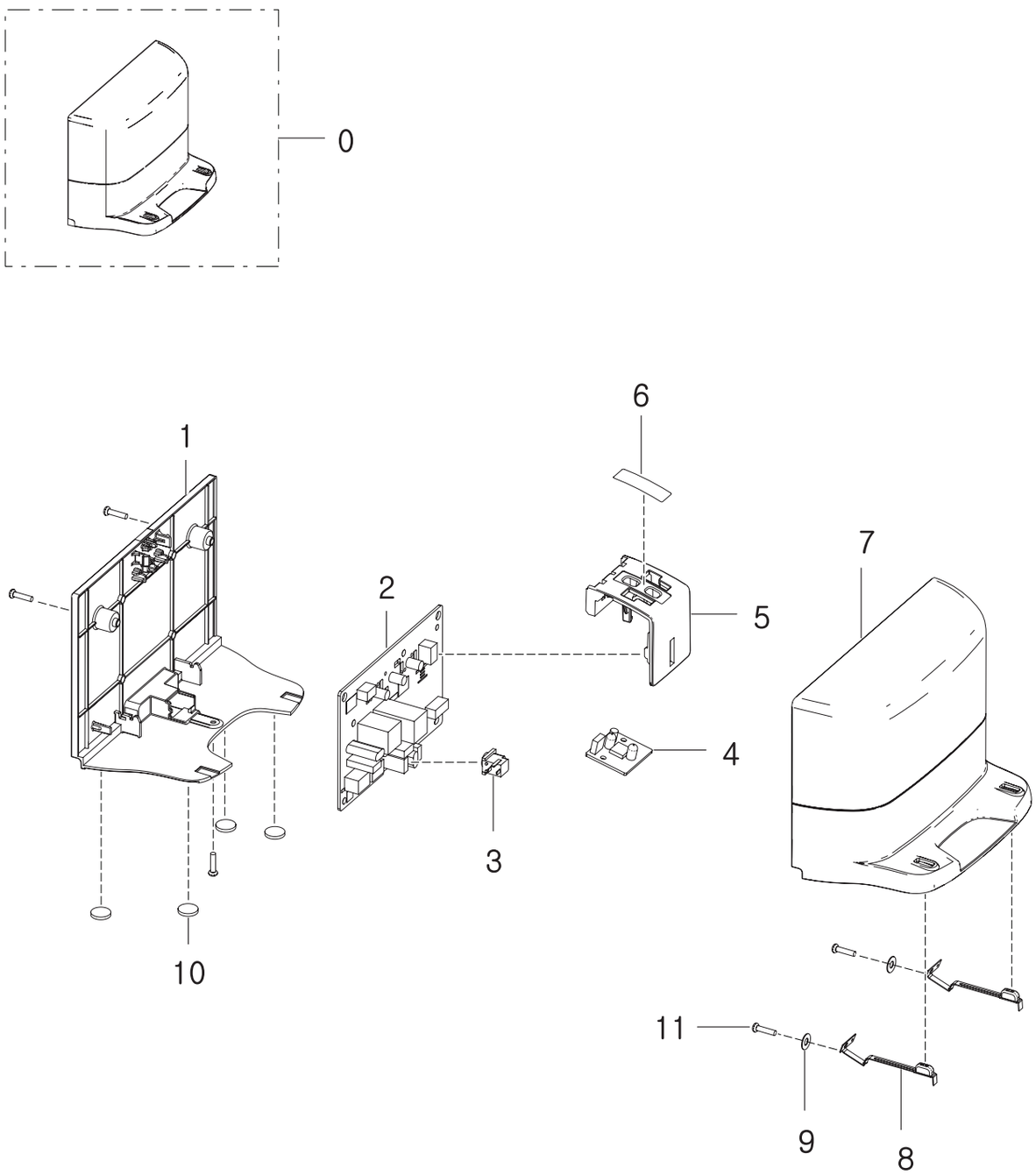
5-4. Assy Charger



Part number	Material code	Part name	Specifications	Quantity	Service Has or does not have	Other
0	DJ96-00192B	ASSY CHARGER	VR9000H,ASSY CHARGER	1	SNA	
1	DJ61-02248A	BODY CHARGER	VR9000H,ABS,-,EBONY BLACK,HB,HG-0760GP	1	SNA	
2	DJ92-00133A	ASSY PCB SUB	CONTROL,VR9000H,121X80.5,24.6V,PATENT,Yes	1	SNA	
3	DJ39-00251B	WIRE HARNESS-POWER	3,YH396-03VR/WHT,-,WHT120/RED120,DC_JACK(DC-038),-,-,UL1061,22,VR9000H,ASSY CHARGER,ASSY,2.1,1,-,3PI/BLK,10,-,-,WHT/RED,	1	SNA	
4	DJ41-00470B	ASSY PCB SUB	Charger_LED,VR9000H,32X28,-,-,-,Charger_LED,Standard	1	SNA	
5	DJ61-02247A	HOLDER PBA	VR9000H,ABS,-,EBONY BLACK,HB,HG-0760GP	1	SNA	
6	DJ64-01219A	INLAY DISPLAY	PC,BLACK	1	SNA	
7	DJ63-01438A	COVER CHARGER	VR9000H,PC,-,V2,DARK GLASS,3022R	1	SNA	
8	DJ97-02179A	ASSY PLATE	VR9000H,-,CHARGER ASSY PLATE	1	SNA	
9	6031-001475	WASHER-PLAIN	SWRCH18A,M4,ID4.2,OD9.8,T0.5,ZPC(YEL)	2	SNA	
10	DJ73-00024A	RUBBER ADAPTER	VC-RP30W,NBR,BLACK	4	SNA	
11	6002-000380	SCREW-TAPPING	PH,+,-,2S,M3,L12,ZPC(WHT),SWRCH18A,-	5	SNA	

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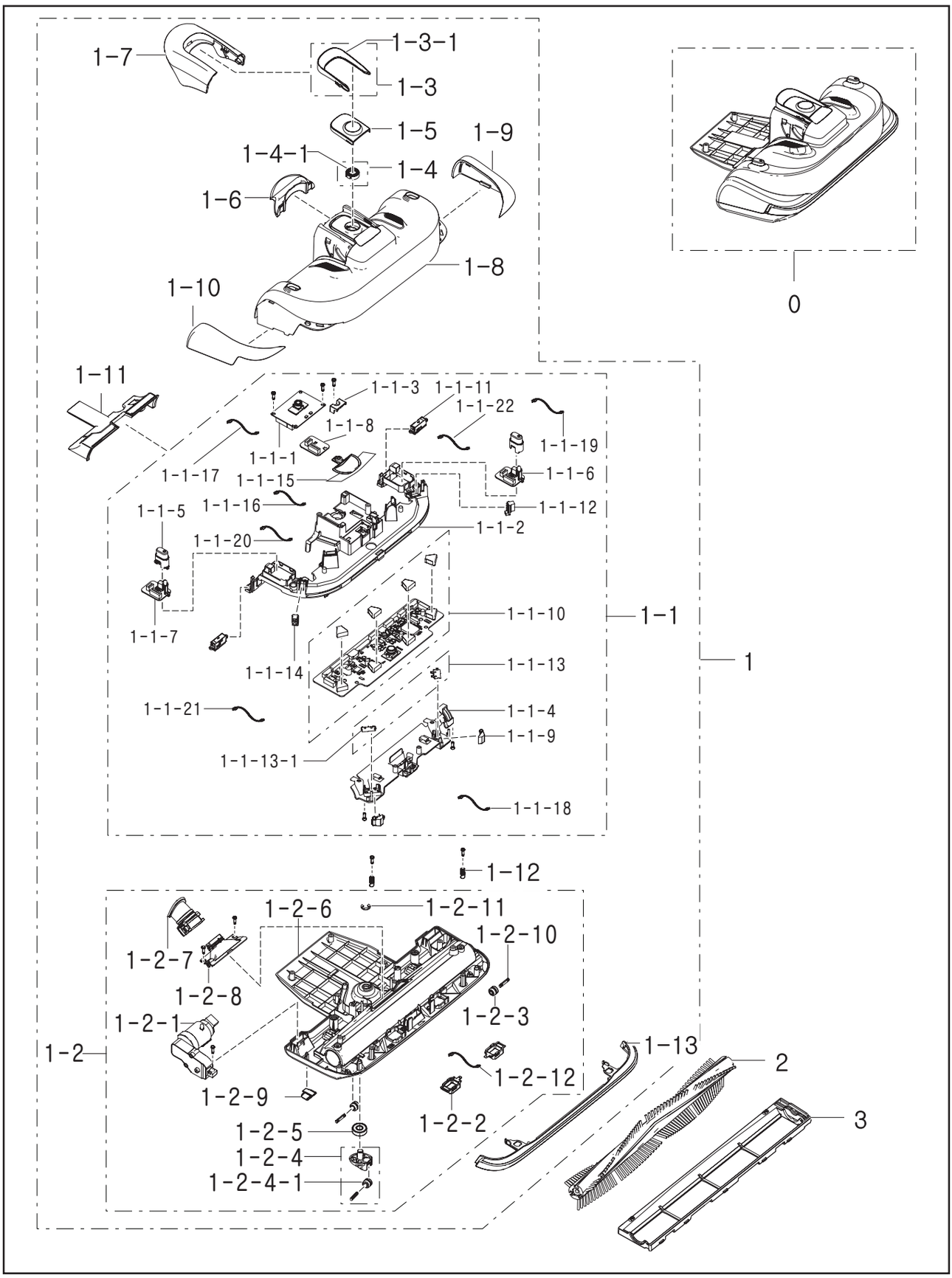
5-5. Assy Brush



Part number	Material code	Part name	Specifications	Quantity	Service Has or does not have	Other
0	DJ97-02175C	ASSY BRUSH	VR9000H,-,-,EXPORT	1	SNA	
	DJ97-02175D		VR9000H,-,-,EXP,DEEP BLUE	1	SNA	
	DJ97-02175F		VR9000H,-,-,EXP,AIRBORNE SILVER	1	SNA	
1	DJ97-02169C	ASSY BODY BRUSH	VR9000H,-,ROBOT BODY BRUSH EXPORT	1	SNA	
	DJ97-02169D		VR9000H,-,EXP DEEP BLUE	1	SNA	
	DJ97-02169F		VR9000H,AIRBORNE SILVER	1	SNA	
1-1	DJ97-02176B	ASSY CASE SENSOR	VR9000H,ASSY CASE SENSOR EXPORT	1	SA	
1-1-1	DJ92-00131A	ASSY MICOM	VR20H90UMD,NXP2120 (VISION)	1	SNA	
1-1-2	DJ61-02236A	CASE SENSOR	VR9000H,ASSY CASE SENSOR EXPORT	1	SNA	
1-1-3	DJ61-02257A	HOLDER LENS	VR9000H,PP,-,BLACK,-,RM60	1	SNA	
1-1-4	DJ61-02237A	HOLDER SENSOR	VR9000H,ABS,-,EBONY BLACK,-,HG-0760GP	1	SNA	
1-1-5	DJ61-02243A	HOLDER TURRET	VR9000H,PC,-,DARK GLASS,HB,3022R	2	SNA	
1-1-6	DJ92-00123A	ASSY PCB SUB	TURRET LEFT,VR9000H,38X29.5,5V,Yes	1	SA	
1-1-7	DJ92-00122A	ASSY PCB SUB	TURRET RIGHT,VR9000H,38X29.5,5V,Yes	1	SA	
1-1-8	DJ92-00126A	ASSY PCB SUB	TURRET CENTER,VR9000H,48.5X25.5,5V,Yes	1	SA	
1-1-9	DJ66-00731A	LEVER BUMPER	VR9000H,POM,K300,NATURAL	2	SNA	
1-1-10	DJ92-00121A	ASSY PCB SUB	SENSOR,VR9000H,73X242,VIRTUAL GUARD,WILD SENSOR,Yes	1	SNA	
1-1-11	DJ32-00014A	SENSOR-DISTANCE	KIR5006C,5V,IR SENSOR,-,-,-	1	SNA	
1-1-12	DJ32-00019A	SENSOR PSD	-40℃ ~ +70℃,5V,Ta=40℃, RH=90%,GP2Y0AF30S	5	SA	
1-1-13	DJ39-00250A	WIRE HARNESS-SWITCH	12507HS-04L/WHT,-,MICRO_SWITCH	1	SNA	
1-1-13-1	3405-000197	SWITCH-MICRO	250V,3A,30gf,SPNO LEVER TYPE	2	SNA	
1-1-14	DJ63-01427A	COVER SENSOR	VR9000H,ABS,-,-,EBONY BLACK,HG-0760GP	3	SNA	
1-1-15	DJ67-00743A	LENS LED	VR9000H,ABS,NATURAL,MP-0160R	1	SNA	
1-1-16	DJ39-00254B	WIRE HARNESS-PBA	15,SMH250-15L/WHT,MAIN-SENSOR,-,-	1	SNA	
1-1-17	DJ39-00254C	WIRE HARNESS-PBA	,08PAE-28S(HF),WHT380,MAIN-ARM	1	SNA	
1-1-18	DJ39-00254D	WIRE HARNESS-PBA	4,240,Insulation-displacement connector	1	SNA	
1-1-19	DJ39-00254F	WIRE HARNESS-PBA	8,SMH200-08H/WHT,RIBBON CABLE	3	SNA	
1-1-20	DJ39-00254G	WIRE HARNESS-PBA	SMH200-03H/WHT,Insulation-displacement connector	1	SNA	
1-1-21	DJ39-00254H	WIRE HARNESS-PBA	6,WHT60/RED60,Insulation-displacement connector	2	SNA	
1-1-22	DJ39-00254J	WIRE HARNESS-PBA	4,SMH200-04H/WHT,Insulation-displacement connector	2	SNA	
1-2	DJ97-02189A	ASSY BASE BRUSH	VR9000H,ROBOT ASSY BASE	1	SA	
1-2-1	DJ97-02178A	ASSY CASE DRUM	VR9000H,-,ROBOT ASSY CASE	1	SA	
1-2-2	DJ97-02177A	ASSY PLATE	VR9000H,-,ROBOT ASSY PLATE	1	SNA	
1-2-3	DJ66-70163A	ASSY ROLLER BRUSH	BRUSH,VC6200,SUB GRY	2	SA	
1-2-4	DJ97-02183A	ASSY ROLLER CASTER	VR9000H,ROBOT	1	SA	
1-2-4-1	DJ66-70163A	ASSY ROLLER BRUSH	BRUSH,VC6200,SUB GRY	2	SA	
1-2-5	6601-002678	BEARING BALL	608ZZ Z3V3,ID8,OD22,L7	1	SNA	
1-2-6	DJ61-02234A	BODY BRUSH	VR9000H,ABS,-,EBONY BLACK,HB	1	SNA	
1-2-7	DJ67-00742A	CAP OUTLET	VR9000H,NBR,-,-,BLACK	1	SNA	
1-2-8	DJ67-00740A	DUCT INLET	VR9000H,ABS,-,HG-0760GP,EBONY	1	SNA	
1-2-9	DJ61-02239A	FIXER BRUSH	VR9000H,ABS,-,YELLOW HALO	2	SNA	
1-2-10	DJ66-50143A	SHAFT ROLLER	VC-BRUSH,PA66,L20.4,OD4,NTR	2	SNA	
1-2-11	6044-000298	RING-E	ID7.0,OD14,T0.8,BLUING(BLK),ST	1	SNA	
1-2-12	DJ39-20275J	WIRE HARNESS-SENSOR	VC-BR836,#22,L120,#2	1	SNA	
1-3	DJ97-02195B	ASSY COVER FRONT	VR9000H,VR9000H	1	SA	
1-3-1	DJ63-01430A	COVER FRONT	VR9000H,PC,-,HB,NATURAL,3022	1	SNA	
1-4	DJ97-02196B	ASSY COVER BRUSH	VR9000H,VR9000H DECORAT	1	SNA	
1-4-1	DJ64-01209A	DECORATION CAMERA	VR9000H,PC,-,NATURAL,H	1	SNA	
1-5	DJ64-01217A	WINDOW CAMERA	VR9000H,PMMA,F6120,NATURAL	1	SNA	
1-6	DJ67-00736A	CAP MID	VR9000H,ABS,-,-,HG-0760GP,EBONY	1	SA	
1-7	DJ63-01425A	COVER UP	VR9000H,ABS,-,HB,EBONY BLACK	1	SA	

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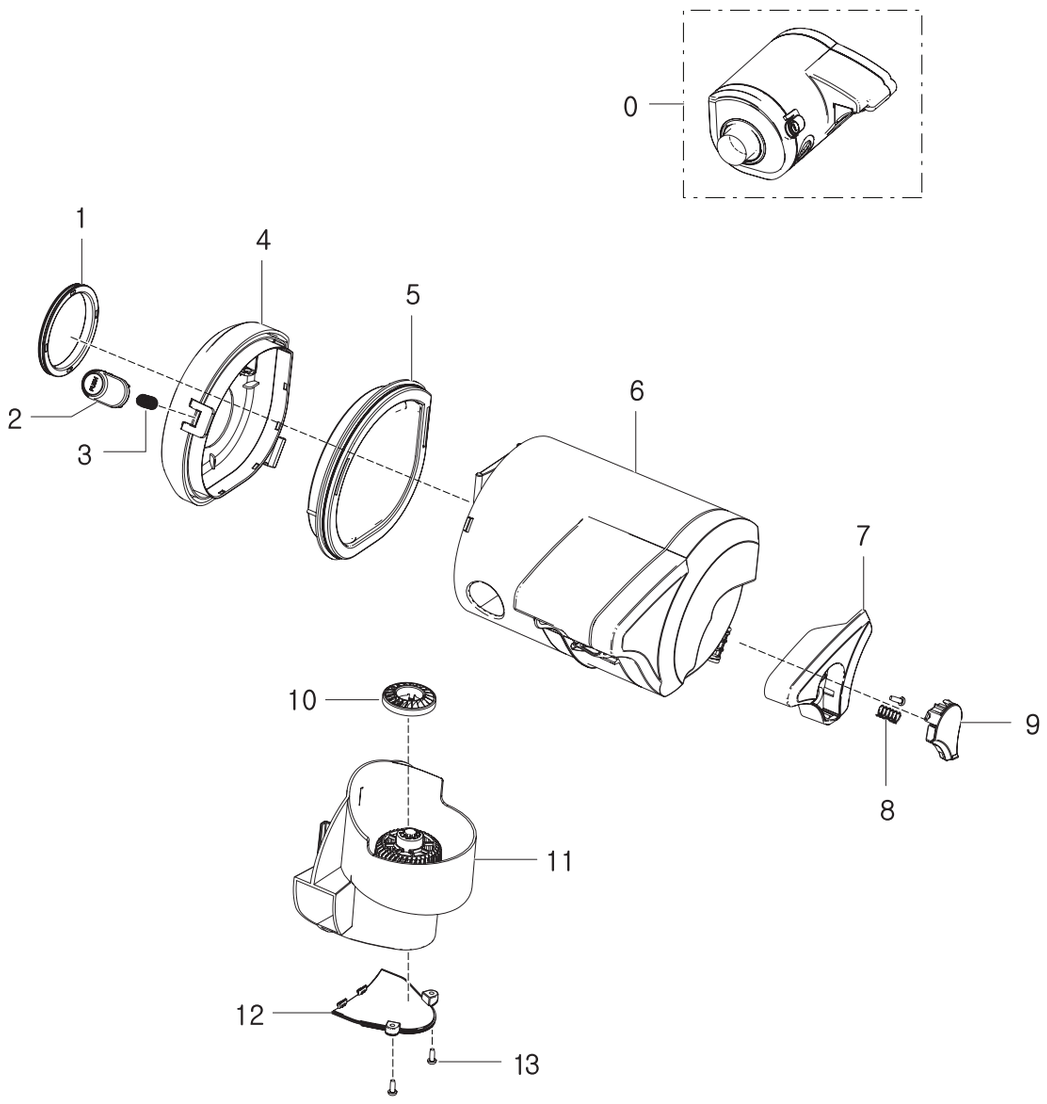
Part number	Material code	Part name	Specifications	Quantity	Service Has or does not have	Other
1-8	DJ63-01426B	COVER BRUSH	VR9000H,PC,HB,DARK GLASS,3022R	1	SNA	
1-9	DJ64-01213A	DECORATION SIDE-LEFT	VR9000H,ABS,-,AIRBORNE	1	SNA	
	DJ64-01213B		VR9000H,ABS,-,DEEP BLUE,LEFT	1	SNA	
1-10	DJ64-01214A	DECORATION SIDE-RIGHT	VR9000H,ABS,-,AIRBORNE	1	SNA	
	DJ64-01213B		VR9000H,ABS,-,DEEP BLUE,RIGHT	1	SNA	
1-11	DJ63-01429A	COVER BASE	VR9000H,ABS,-,-,EBONY BLACK	1	SNA	
1-12	DJ61-02271A	SPRING ETC COIL	VR9000H,HSWR,0.9,5.4,7.4	2	SNA	
1-13	DJ61-02233A	BODY BUMPER	VR9000H,ABS,-,EBONY BLACK,-,HG-0760GP	1	SNA	
	DJ61-02233B		VR9000H,ABS,-,AZURE BLUE,HB,HG-0760GP	1	SNA	
2	DJ97-02172A	ASSY DRUM BRUSH	VR9000H,VR9000H	1	SA	
3	DJ97-02173A	ASSY COVER DRUM	VR9000H,VR9000	1	SA	

※ SA = serviceable material/SNA = unserviceable material

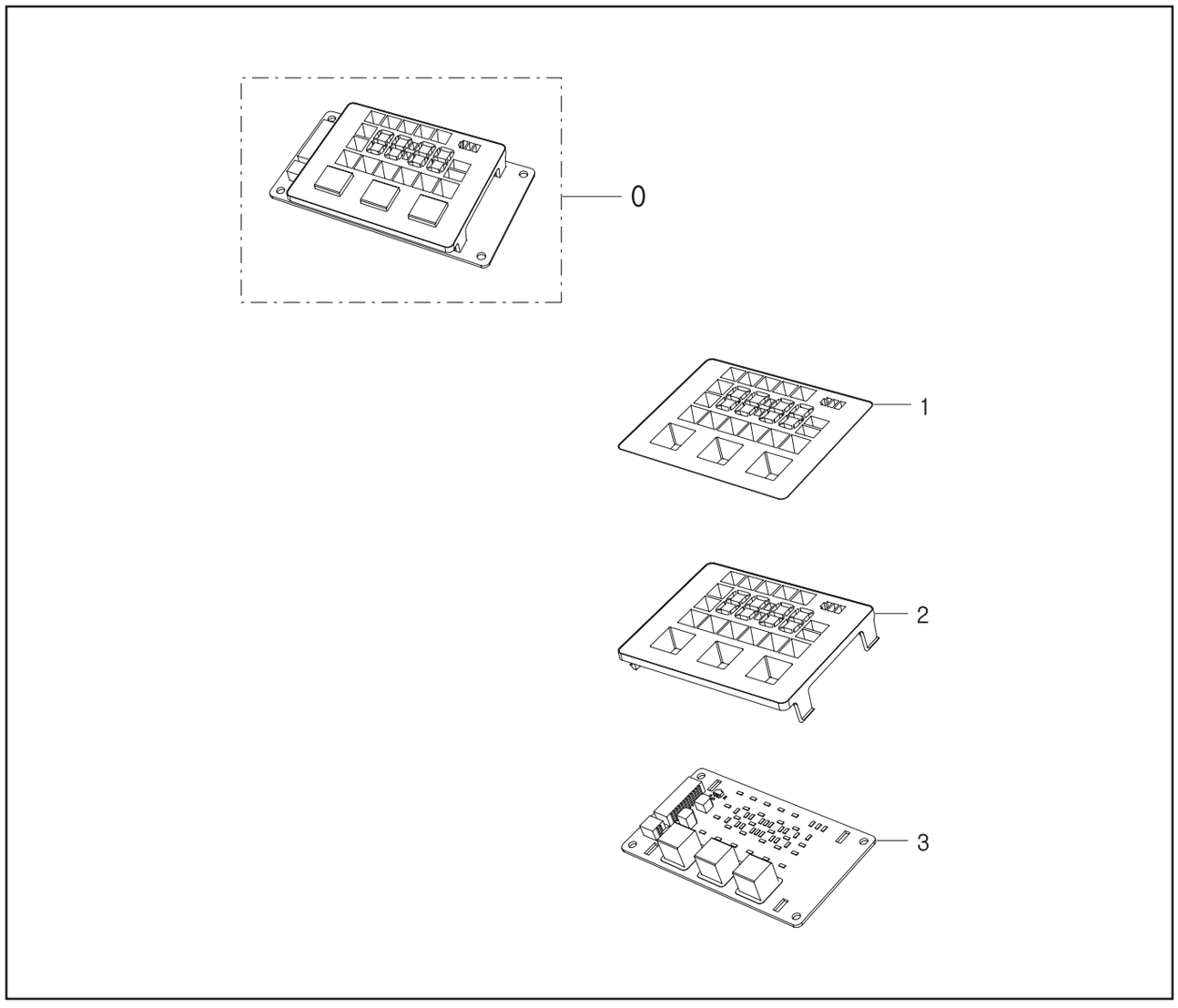
5-6. Assy Cyclone



Part number	Material code	Part name	Specifications	Quantity	Service Has or does not have	Other
0	DJ97-02170A	ASSY CYCLONE	VR9000H,ROBOT CYCLONE	1	SA	
	DJ97-02170B		VR9000H,ASSY CYCLONE BLUE	1	SA	
1	DJ66-00733A	DAMPER SUCTION	VR9000H,TPV,85,BLACK,-	1	SNA	
2	DJ65-00087A	CLAMPER DUST	VR9000H,ABS,HG-0760GP,YELLOW HALO	1	SNA	
3	DJ61-70001P	SPRING ETC-PUSH	JAZZ-PJT,SUS,CD0.7,ID6.1,L20,N7,BLUING	1	SNA	
4	DJ61-02244A	CASE FILTER	VR9000H,PC,-,GRAY TR-P,HB,SR1300	1	SNA	
	DJ61-02244B		PC,-,DEEP BLUE TRP,HB,SR1300	1	SNA	
5	DJ63-01436A	FILTER CYCLONE	VR9000H,PU,T13,W100,L105,EBONY BLACK,PU FOAM+MICRO	1	SA	
6	DJ61-02246A	CASE CYCLONE	VR9000H,PC,-,GRAY TR-P,HB,SR1300	1	SNA	
	DJ61-02246B	CASE CYCLONE	VR9000H,PC,-,DEEP BLUE TRP,HB,SR1300	1	SNA	
7	DJ67-00738A	CAP CASE	VR9000H,PC,-,V2,3022R,DARK GLASS	1	SNA	
8	DJ61-01601A	SPRING ETC-DUST	AUTOBOT,STAINLESS-STS304,CD0.5,ID7,OD8,L16,N5	1	SNA	
9	DJ64-01211A	BUTTON CYCLONE	VR9000H,PC,V2,DARK GLASS	1	SNA	
10	DJ64-01210A	GRILLE CYCLONE	VR9000H,ABS,HB,AIRBORNE	1	SNA	
11	DJ61-02256A	CASE CYCLONE-IN	VR9000H,ABS,-,GRAY TR-P,HB,TX-0510	1	SNA	
12	DJ63-01442A	COVER DUCT	VR9000H,ABS,-,HB,GRAY TR-P,TX-0510	1	SNA	
13	6002-000630	SCREW-TAPPING	PH,+,NO,2S,M3,L8,ZPC(WHT),SWRCH18A	3	SNA	

※ SA = serviceable material/SNA = unserviceable material

5-7. Assy Holder Display



Part number	Material code	Part name	Specifications	Quantity	Service Has or does not have	Other
0	DJ97-02181A	ASSY HOLDER DISPLAY	VR9000H,VR9000H ASSY HOLDER DISPLAY	1	SA	
1	DJ64-01218A	INLAY DISPLAY	VR9000H,PC,T0.25,BLACK,ICE BLUE	1	SNA	
2	DJ61-02251A	HOLDER LAMP	VR9000H,ABS,-,DA WHITE,-,HG-0760GP	1	SNA	
3	DJ92-00124A	ASSY PCB DISPLAY	DISPLAY,VR9000H,64.5X121.21.6V,Yes	1	SA	

※ SA = serviceable material/SNA = unserviceable material

6. Troubleshooting

6–1. Main body display error codes and solutions

Check code	Cause	Actions
E 01	▶ Foreign matter (thread, paper, toys, etc.) caught in the Power Brush	▶ Turn off the emergency switch on the bottom of the cleaning robot and then **remove** the foreign matter from the Power Brush.
E 02	▶ Foreign matter (thread, paper, toys, etc.) caught in the left drive wheel	▶ Turn off the emergency switch on the bottom of the cleaning robot **and then remove** the foreign matter from the left drive wheel.
E 03	▶ Foreign matter (thread, paper, toys, etc.) caught in the right drive wheel	▶ Turn off the emergency switch on the bottom of the cleaning robot **and then remove** the foreign matter from the right drive wheel.
E 05	▶ The Bumper sensor needs maintenance	▶ Turn off the Emergency Switch on the bottom and remove the obstacle attached to the front of the Robot Cleaner. Or, check if there is any foreign substance in between the Bumper and the Main Frame, and then remove it.
E 06	▶ Foreign matter (dust, smudges, etc.) accumulated on the Obstacle Sensor window	▶ Turn off the emergency switch on the bottom of the cleaning robot **and then wipe the front and rear sensor windows clean with a** soft cloth.
E 07	▶ Foreign matter (dust, smudges, etc.) accumulated on the Cliff Sensor window	▶ Turn off the emergency switch on the bottom of the cleaning robot **and then wipe the Cliff Sensor window clean with a** soft cloth.

※ Press the ⏯ button on the main body or the ⏯ button on the remote or turn off the emergency switch and the error code will be cleared.

※ Voice information is given during error codes. (During Voice mode)

6-2. Malfunction diagnosis and solutions

※ Ensure you turn off the emergency switch before performing any maintenance.

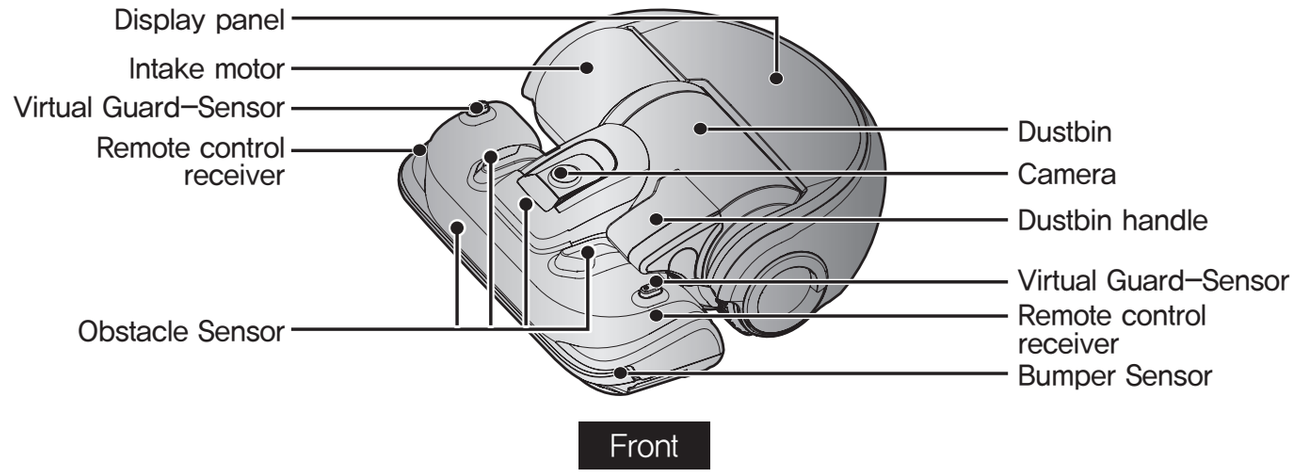
Problems	Cause	Solutions
The intake motor does not turn over.	Battery drained	Charge battery
	Motor damaged (burned)	Exchange motor
	Wire disconnected	Connect wire
	Solderless terminal disconnected	Reassemble solderless terminal
	Battery malfunction	Exchange battery
	Projector operation from battery overheating	Cool battery
	PBA MAIN malfunction	Exchange PBA MAIN
The wheel motor does not turn over.	Foreign matter caught in the wheel	Remove foreign matter
	Gearbox damaged	Exchange gearbox
	Battery drained	Charge battery
	Motor damaged (burned)	Exchange motor
	Motor wire disconnected	Connect motor wire
	Wire terminal contact malfunction	Reconnect the terminal
	PBA MAIN malfunction	Exchange PBA MAIN
	Battery malfunction	Exchange battery
	Battery overheating prevention equipment operates due to battery overheating	Cool battery
The Power Brush does not operate.	Foreign matter caught in Power Brush	Remove foreign matter from the Power Brush
	Battery drained	Charge battery
	Motor wire disconnected	Connect motor wire
	Motor damaged (burned)	Exchange motor
	Motor overheats and overheating prevention equipment operates	Cool motor
	Motor housing terminal disconnected	Reassemble terminal
	Battery malfunction	Exchange battery
	PBA MAIN malfunction	Exchange PBA MAIN
	Battery overheats and overheating prevention equipment operates	Cool battery
The suction power is weak.	Battery worn out	Exchange battery
	Insufficient battery remaining	Charge battery
	The dustbin is full	Empty dustbin
	Power Brush assembly malfunction	Reassemble Power Brush
	Power Brush rotation malfunction due to foreign matter caught in the brush	Remove foreign matter
	Insufficient rotation power due to foreign matter caught in the intake motor area	Remove foreign matter

※ Battery worn out: As the batter is used more (more times), the battery's charging time and usage time decrease until the lifespan of the battery is used up.

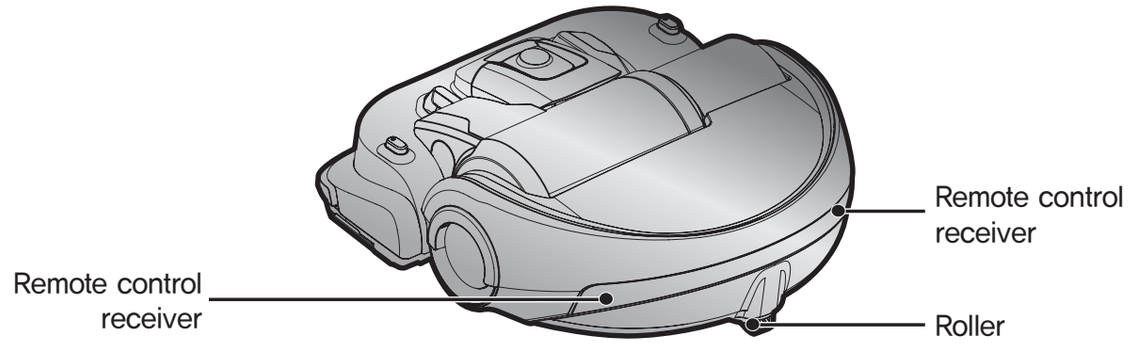
Problems	Cause	Solutions
Unusual sound	The impeller is full of foreign matter.	Remove foreign matter:
	Impeller fastener assembly malfunction	Reassemble impeller
	Foreign matter caught in drum brush	Remove foreign matter
	Foreign matter caught in intake motor area	Remove foreign matter
	Gearbox abrasion on drum motor part	Exchange drum motor gearbox
Power malfunction	Battery fuse disconnected	Exchange battery
	Battery overheats and overheating prevention equipment operates	Cool battery
	Battery cell disconnected	Exchange battery
	Emergency switch contact point malfunction	Exchange emergency switch
	Battery wire disconnected	Connect wire
The robot keeps going in reverse even without any obstacles	Bumper continually pressed	Remove foreign matter from the bumper and reassemble
	Faulty operation of Cliff Sensor	Remove foreign matter from the sensor window Check connectors and exchange sensor
	Magnetic sensor malfunction	Exchange ASSY SENSOR
Automatic charging does not work well	when there are obstacles within 1.5 m around the left/right/front of the charger	Move to another location without obstacles
	When cleaning doesn't start from the charger	Start cleaning from the charger
	When the cleaning robot moves through part of the space and then cleans	Start cleaning from the charger
	Partial malfunction in the charger infrared light sensor	Exchange PBA SMPS
Automatic charging does not work.	Abnormal voltage to the charger socket	Check charger connector and exchange ASSY SMPS
	Charger infrared light sensor malfunction	Exchange PBA–ADAPTOR
	Charger signal detection sensor malfunction	Exchange PBA–REMOTE
The robot does not clean and just rotates on one spot.	Obstacle Sensor malfunction	Exchange Obstacle Sensor
	PBA MAIN malfunction	Exchange PBA MAIN
The robot falls in stairs or an entryway	Cliff Sensor malfunction	Exchange sensor
	Cannot recognize steps due to shoes or other obstacles	Remove obstacles
	There is/is not virtual guard(Option)	Install virtual guard
The robot cannot more directly forward and travels crookedly	Straight line correction sensor malfunction	Exchange PBA MAIN
	Wheel motor encoder malfunction	Exchange wheel motor
	PBA MAIN malfunction	Exchange PBA MAIN
The set time is not correct.	Set the time without	initializing time settings
	PBA MAIN malfunction	Exchange PBA MAIN
	Clock battery malfunction	Exchange PBA MAIN
The remote control does not work	Remote control battery drained	Exchange battery
	Remote control sensor module malfunction	Exchange PBA FRONT RECEIVER Exchange PBA MID RECEIVER

6-3. Entering test mode and performing maintenance

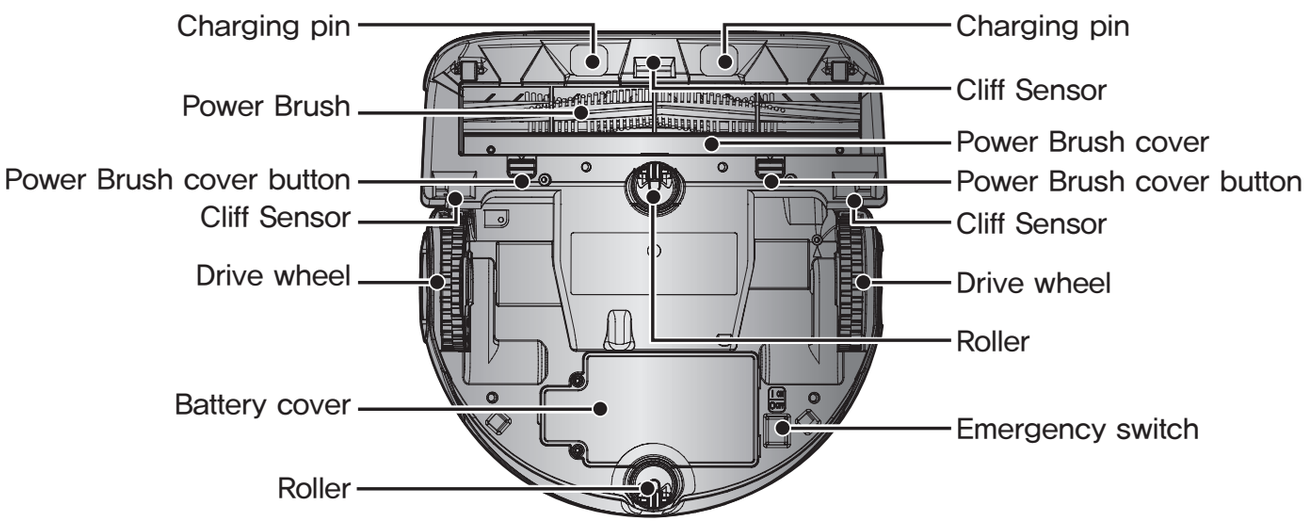
6-3-1. Each area's sensor location



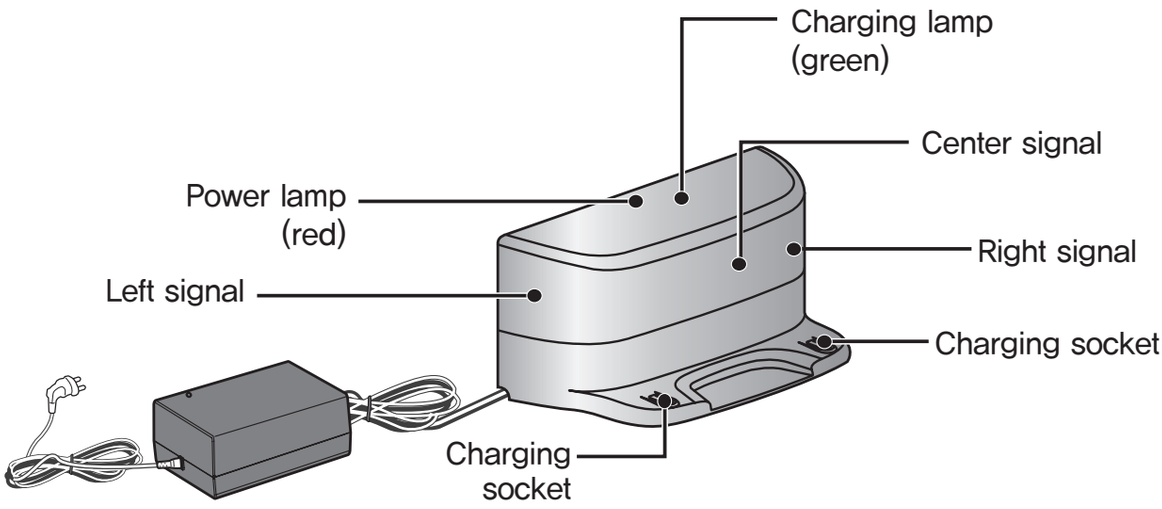
Front



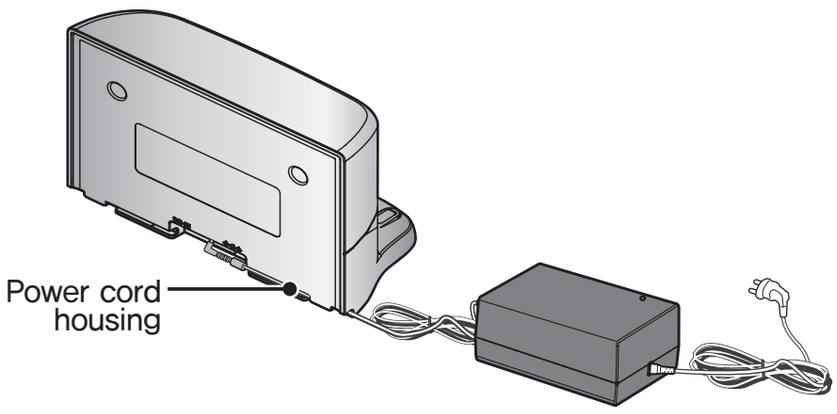
Side



Floor


Charging lamp
(green)
Center signal
Power lamp
(red)
Right signal
Left signal
Charging socket
Charging
socket

Front

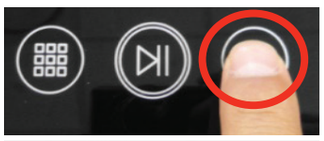

Power cord
housing

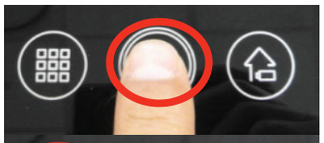
Rear

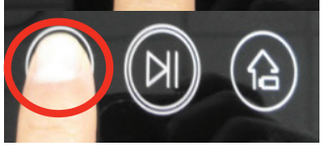
6–3–2. How to enter test mode

1. Turn on the main body emergency switch.

2. Hold down the button for 3 seconds.



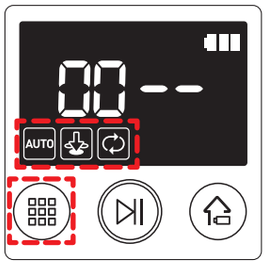




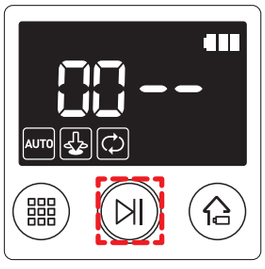
3. If buttons are pressed in the order of → → , test mode is entered.

6–3–3. Starting testing

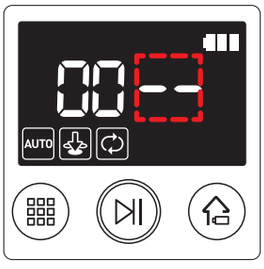
1. Press the button on the main body to select the sensor from #1–5 that you wish to test.
   ▶ Each time you press the button on the main body, the cleaning mode ( ) changes in order so you can select the sensor item you wish to test (Refer to p. 111–117)



2. Press the button on the main body to select the sensor type that you wish to test.
   ▶ Each time you press the button on the main body, the display ( ) changes in order so you can select the sensor type you wish to test (Refer to p. 111–117)



3. Compare the "Standard Table" (p. 111–117) with the value indicated on the display to determine whether or not there is a malfunction and take steps to correct it



6-3-4. Test methods and criteria

Mode display (Cleaning mode)	Sensor check type display	Sensor name	Judgment method	Display panel (criteria)
AUTO Sensor check 1 (ON/OFF form)	00	Left, center Bumper Sensor	If the left, left-center bumper is not pressed	00:88
			If the left, left-center bumper is pressed	00:80
	01	Right, center Bumper Sensor	If the right, center-right bumper is not pressed	01:88
			If the right, center-right bumper is pressed	01:80
	02	Left gap sensor	If the left wheel is on the floor	02:88
			If the left wheel is raised	02:80
	03	Right gap sensor	If the right wheel is on the floor	03:88
			If the right wheel is raised	03:80
	07	Remote control receiver	If the buttons (Spot/Point Cleaning/ Manual/Auto) are not pressed.	07:88
			If the buttons (Spot/Point Cleaning/ Manual/Auto) are pressed.	07:80
	08	Signal reception/ receiver check	If the Clock button in the middle bottom of the remote control is pressed, the receiver will detect the signal and display the sign.	08:33
	09	Gyro Sensor	Initial value 50. Increases in units of 1	09:50
	10	Docking sensor	If the robot is not docked	10:88
			If the robot is docked ※0 flickers if there is a communication malfunction between robot and charger	10:80
	12	RTC test	If the RTC is not operating normally	12:88
			If the RTC is operating normally	12:80
			※ Not displayed on models without RTC	12:88

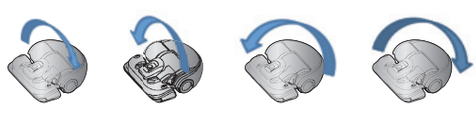
※ 04, 05, 06, 11, check functions are not on the sensor check type display.

Mode display (Cleaning mode)	Sensor check type display	Sensor name	Judgment method	Display panel (criteria)
AUTO Sensor Check 2 (Obstacle Sensor / Cliff Sensor / Upper Contamination Sensor)	00	Left Obstacle PSD Sensor (L0)	"25" displayed when there are no obstacles As the distance to an obstacle decreases the number decreases	Distance value (Display 4 ~ 25)
	↓	Full view Obstacle sensor		↓
	11	Right Obstacle PSD Sensor (R0)		Distance value (Display 4 ~ 25)
	12	Left Cliff Sensor	If the cleaning robot is on the floor	88:25
			If the cleaning robot is raised 5 cm or more	88:80
	13	Center Cliff Sensor	If the cleaning robot is on the floor	88:25
			If the cleaning robot is raised 5 cm or more	88:80
	14	Right Cliff Sensor	If the cleaning robot is on the floor	88:25
			If the cleaning robot is raised 5 cm or more	88:80
	15	Left Upper Contamination Sensor	"25" is displayed when there are no obstacles, and the number decreases as the distance to an obstacle decreases	Distance value (Display 4 ~ 25)
	16	Center Upper Contamination Sensor		
	17	Right Upper Contamination Sensor		

※ On a model with 12 Obstacle Sensors, for example, the sensor check numbers for judgments of the left (L0) – right (R0) Obstacle Sensors are 00 – 11, and the left/center/right Cliff Sensor check numbers are, in order, 12 / 13 / 14. The left / center / right Upper Contamination Sensor check numbers are 15 / 16 / 17.

Mode display (Cleaning mode)	Sensor check type display	Sensor name	Judgment method	Display panel (criteria)
Sensor check 3 (Charger) ※ Check while the SET is moving to the left from the front of the charger	00	Front left receiver	When signal is not received	00 : FF
			When a left signal is detected	00 : CB
			When a right signal is detected	00 : 33
			When a center signal is detected	00 : 1B
	01	Front right receiver	When signal is not received	01 : FF
			When a left signal is detected	01 : CB
			When a right signal is detected	01 : 33
			When a center signal is detected	01 : 1B
	02	Rear right receiver	When signal is not received	02 : FF
			When a left signal is detected	02 : CB
			When a right signal is detected	02 : 33
			When a center signal is detected	02 : 1B
	03	Rear left receiver	When signal is not received	03 : FF
			When a left signal is detected	03 : CB
			When a right signal is detected	03 : 33
			When a center signal is detected	03 : 1B
Sensor Check 3 (Virtual Guard : Option) ※ Applicable to export models	04	VG left	When signal is detected	04 : 0F
		VG right	When signal is detected	04 : F0
		Simultaneous left/right	When signal is detected	04 : 00
			When there is no signal	04 : FF

Mode display (Cleaning mode)	Sensor check type display	Sensor name	Judgment method	Display panel (criteria)
Sensor check 4 (Battery information)	00	Battery remaining	Current battery remaining (%)	Check number
	01	Total use frequency	Accumulated battery 2200 mA frequency of use	Check number
	02	Cycle count	Battery completely charged – completely empty count	Check number
	03	Current temperature	Current battery temperature	Check number
	04	Current voltage	Currently battery voltage	Check number
	05	Current current	Current battery current Battery drained: display (–) If put on the charger, (–) disappears	Check number
	06	Battery normal/ abnormal	Battery normal: PASS Battery abnormal: FAIL	

Mode display (Cleaning mode)	Sensor check type display	Sensor name	Judgment method	Display panel (criteria)
Sensor check 5 (Motor and encoder) Notes: Since the motor is running, lift the wheels from the floor.	00	R wheel motor	When the motor is running normally	00 : Rev count increase
			When the motor is running in reverse	00 : Rev count decrease
	01	L wheel motor	When the motor is running normally	01 : Rev count increase
			When the motor is running in reverse	01 : Rev count decrease
	02	Power Brush motor	Normal: Motor running	02 : Rev count increase
	03	Intake motor	When the motor is running	Check RPM
	05	Acceleration Sensor	When stopped	55 55
			 5753 5353 5573 5533	
	06	Dust Awareness Sensor	If the Dust Awareness Sensor is covered	06 : 80
			If the Dust Awareness Sensor is not covered (50 or more)	06 : 90

※ 04 has no check function on the sensor check type display.

Mode display (Cleaning mode)	Sensor check type display	Sensor name	Judgment method	Status display (criteria)
Sensor check 6 (LED / version information)	LED ON	Check all LEDs	Display Board Check whether all LEDs are operating	LED ALL ON
		Main version	From LED ON Input the main body Start/ Stop button	Check Main Board version
		Sensor version	From check Main Board version, input the main body Return to Charger button	Check Sensor Board version
		Display version	From check Sensor Board version, input the main body Return to Charger button	Check Display Board version
		Vision version	From check Display Board version, input the main body Return to Charger button	Check Vision Module version

Test mode	Sensor name	Sensor check type	Judgment method		Criteria
Sensor check 7 (communication status)		Overall (normal status)	Check according to communication status for each board		–
		Main board ↔ Vision module	Check 2nd 7–segment		LED ON: Normal LED OFF: Malfunction
				: Main board → Vision module	
				: Vision module → Main board	
		Main board ↔ Sensor board	Check 3rd 7–segment		LED ON: Normal LED OFF: Malfunction
		Main board ↔ Display board	Check 4th 7–segment		LED ON: Normal LED OFF: Malfunction

※ Sensor check 7 → Main body's "Start/Stop" button → Sensor check 8
Use the remote control ◄► directional buttons to select sensor check type.

Mode display (Cleaning mode)	Sensor check type display	Sensor name	Judgment method	Display panel (criteria)
Sensor check 8 (error log)		Occurring error code	**Check error code** (Latest occurring error code in order) Check detailed information on the occurring error code with the remote control's ▲ directional button	– –: No error code 0: Error code C00 1: Error code C01 2: Error code C02 3: Error code C03 5: Error code C05 6: Error code C06 7: Error code C07
	...	...		
		Occurring error code		
		Standby during cleaning	Check criteria	– –: Error code occurred 1: Main body's Start/Stop button 2: Main body's Start/Stop button (3 seconds) 3: Remote control's Start/Stop button 4: Remote control's Power button

※ Detailed error code information

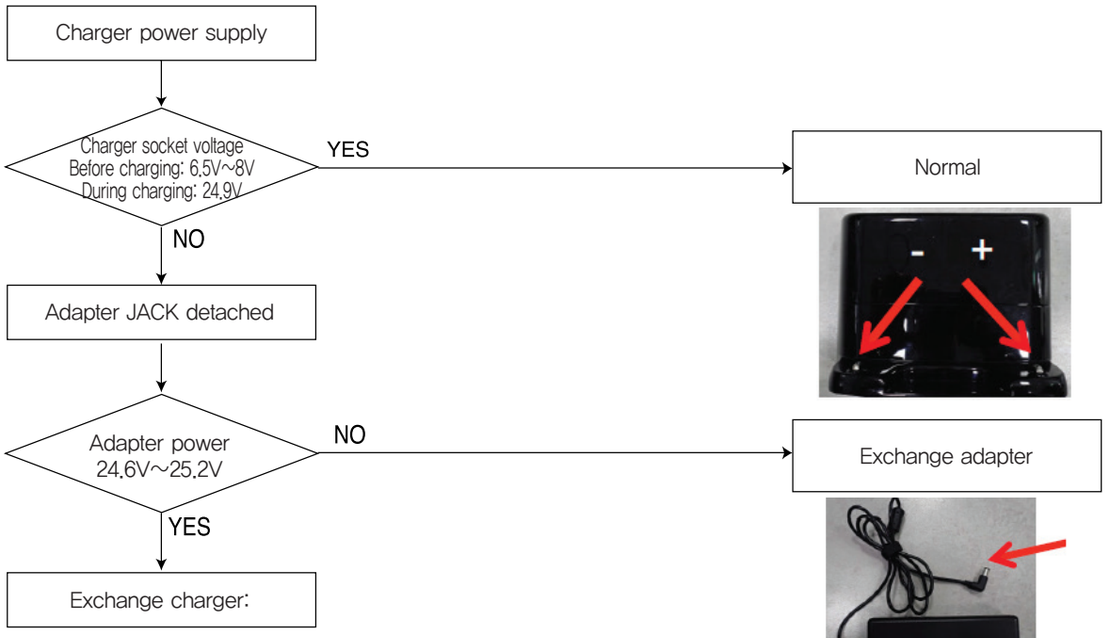
Number	Error code	Detailed error code information	
– –	No error code	Detailed code	Information
0	C00 (Problem during cleaning robot operation, e.g. something has been caught, the robot has been trapped or stopped)	00	[ARM] Caught in a narrow area
		01	[ARM] Continuous slip detection
		02	[ARM] Caught in the Virtual Guard signal and cannot operate
		03	[MAIN] Cannot operate due to right drive wheel being caught
		04	[MAIN] Cannot operate due to left drive wheel being caught
1	C01 (Foreign matter caught in Power Brush)	10	Operation error due to trapping of Power Brush
2	C02 (Foreign matter caught in right drive wheel)	20	Operation error due to trapping of right drive wheel
		21	Right drive wheel drive IC operation error
3	C03 (Foreign matter caught in left drive wheel)	30	Operation error due to trapping of left drive wheel
		31	Left drive wheel drive IC operation error
5	C05 (Bumper Sensor needs maintenance)	50	Operation error due to continuous pressing of Bumper Sensor
6	C06 (Foreign matter accumulation on Obstacle Sensor window)	60	Operation error due to inability to detect distance due to foreign matter accumulated on the Obstacle Sensor window
		61	Operation error due to inability to detect distance due to foreign matter accumulated on the Upper Contamination Sensor window
7	C07 (Foreign matter accumulation on Cliff Sensor window)	70	Operation error due to inability to detect distance due to foreign matter accumulated on the Cliff Sensor window

6-4. PCB malfunctions and solutions

6-4-1. If the battery is not charged

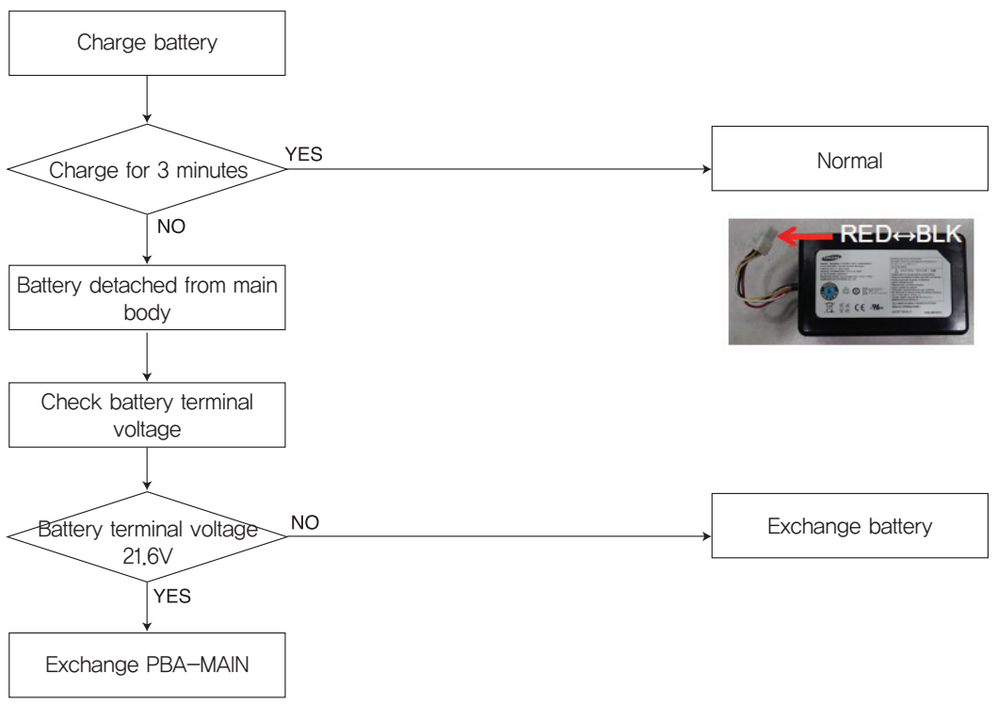
6-4-1-1. Charger maintenance

※ Exchange parts after turning off the emergency switch.



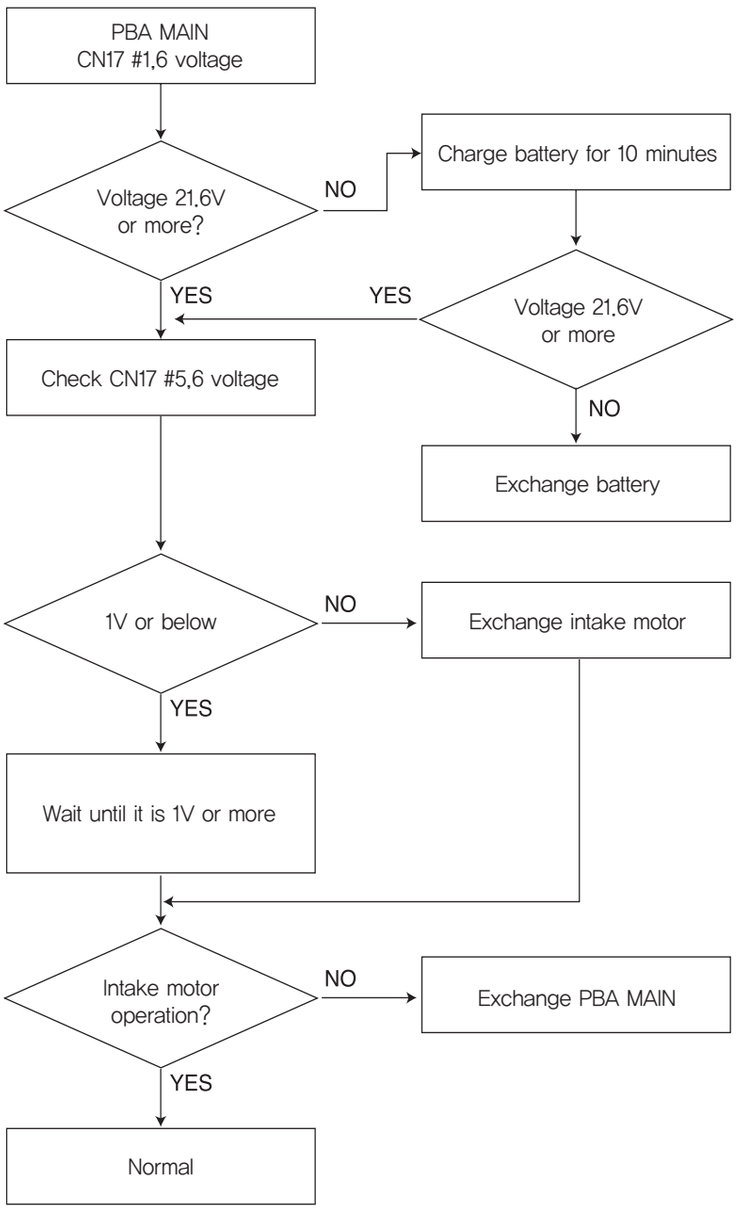
6-4-1-2. Battery maintenance

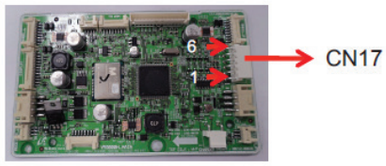
※ Exchange parts after turning off the emergency switch.



6-4-2. Intake motor operation malfunction

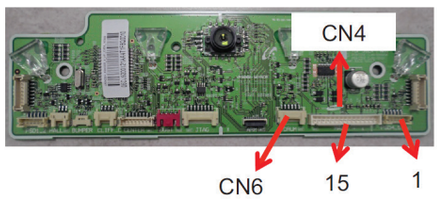
※ Exchange parts after turning off the emergency switch.





6-4-3. Power Brush motor operation malfunction

※ Exchange parts after turning off the emergency switch.



CN4
Check voltage between #1-3

Is the voltage 20V or more?

No → 1. Check SENSOR – MAIN WIRE connection → connectors connected
2. Check SWITCH ON/OFF → SWITCH unit maintenance
3. Check BATTERY connection → check connector connections
4. Check BATTERY voltage → check whether the battery is charged

Yes

CN4
Check voltage between #3-5

Is the voltage 5V?

No → 1. MAIN BD 5V power maintenance

Yes

Detach CN6 housing
Measure resistance between housing 1-6

Is the resistance figure ∞ or 0 ohms?

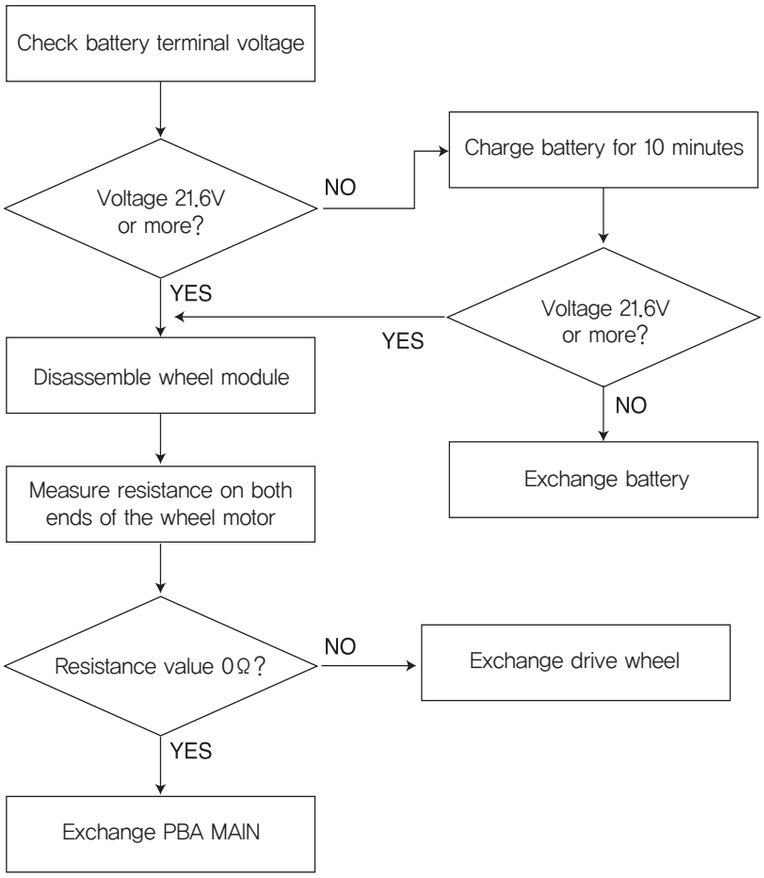
No → Exchange SENSOR BD

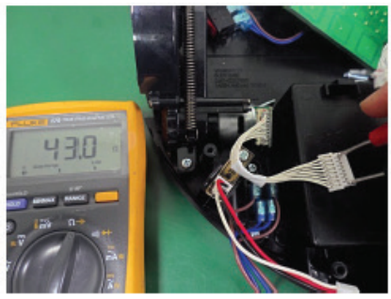
Yes

Exchange motor

6-4-4. Drive wheel motor operation malfunction

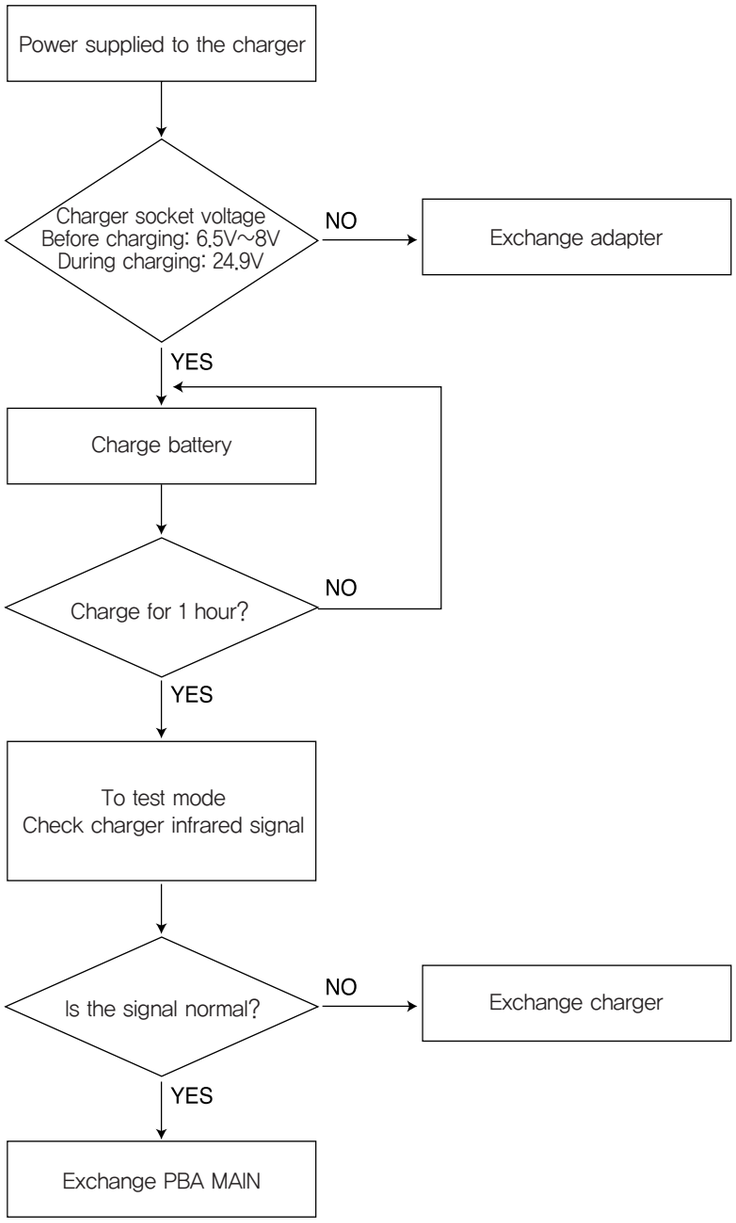
※ Exchange parts after turning off the emergency switch.





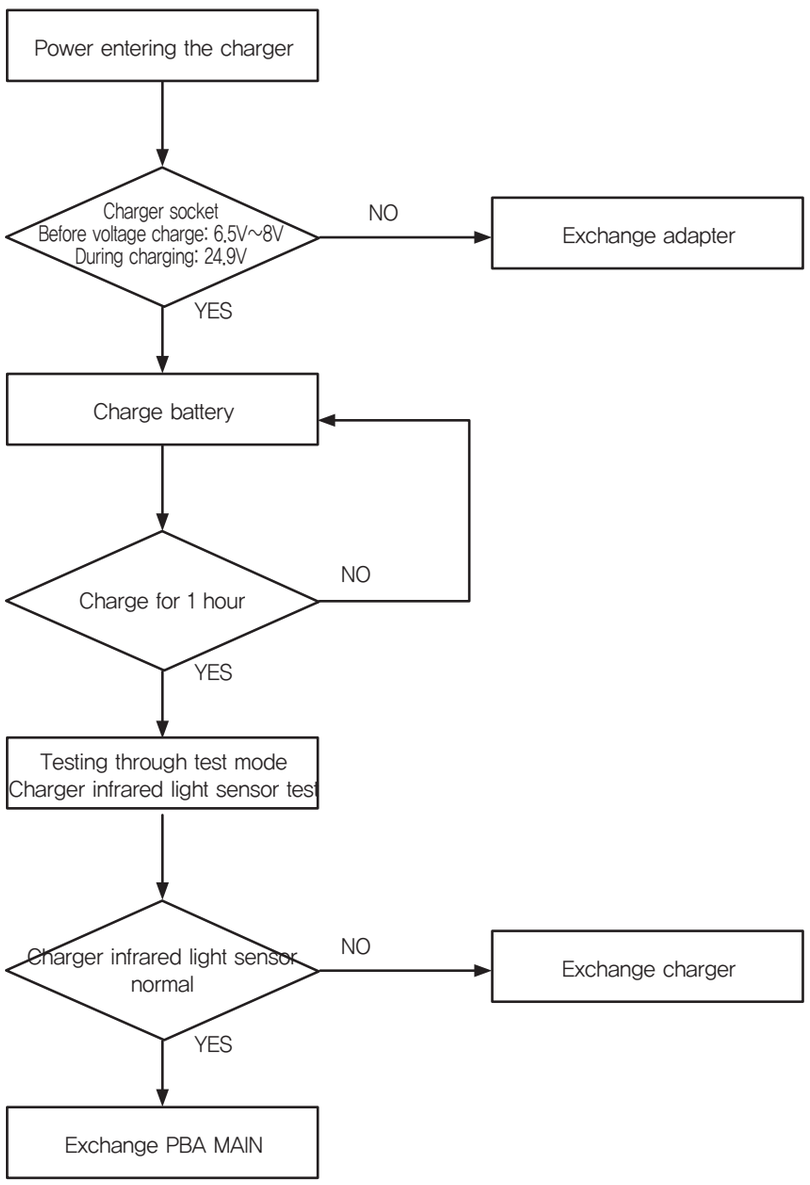
6-4-5. Automatic charging malfunction

※ Exchange parts after turning off the emergency switch.



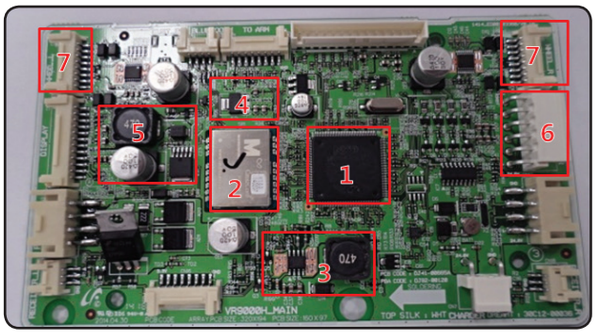
6-4-6. Charge docking malfunction

※ Exchange parts after turning off the emergency switch.



7. Part Layout

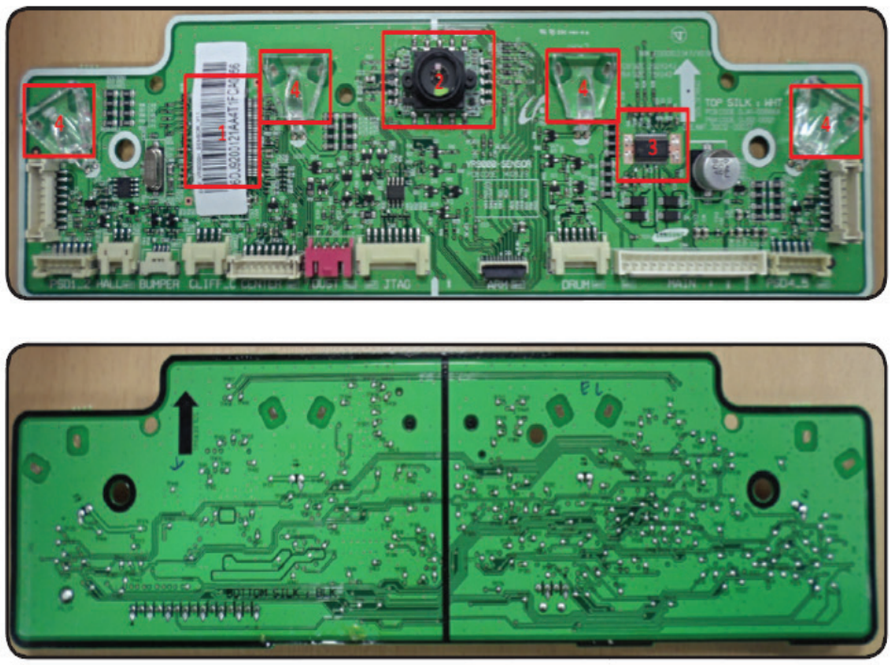
7-1. PBA MAIN (main body)



Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ92-00120B	ASSY PCB MAIN	PBA MAIN,VR9000H,160X97,DC 21.6V,Yes	1	SA	

1. MICOM
2. Gyro module
3. 5V power circuit
4. 3.3V power circuit
5. 12V power circuit (display)
6. Suction motor connector
7. Wheel motor connector

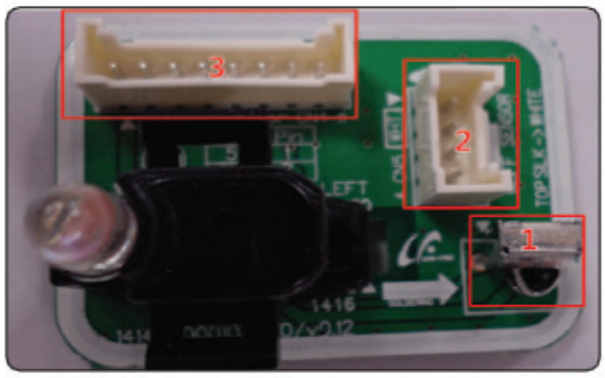
7-2. PBA-SENSOR

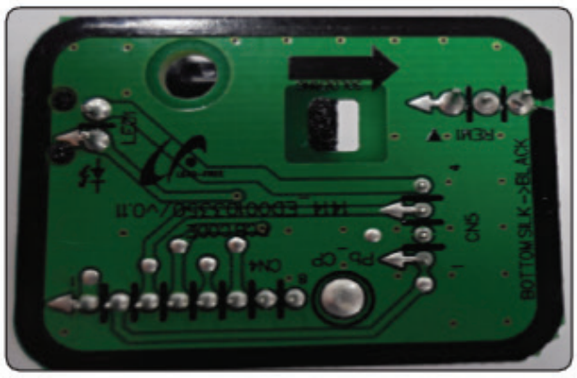


Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ92-00121A	ASSY PCB SUB	SENSOR,VR9000H,73X242,VIRTUAL GUARD,WILD SENSOR,Yes	1	SA	

1. MICOM
2. Camera module (for detecting obstacles)
3. Drum motor driver
4. IR-LED for detecting obstacles

7-3. PBA-TURRET-SUB-LEFT

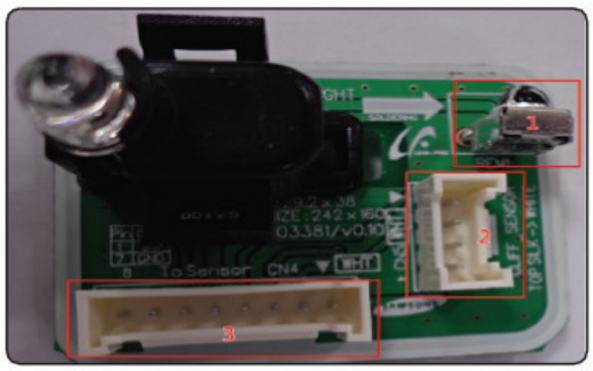


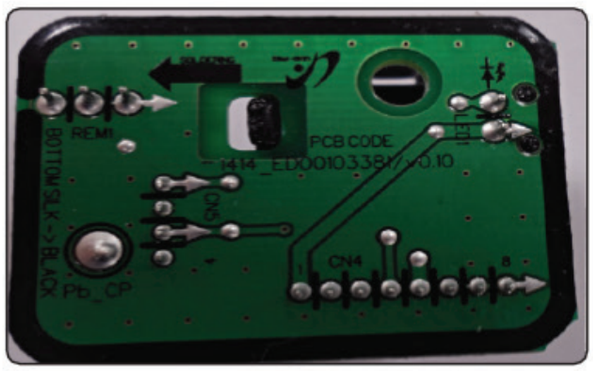


Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ92-00123A	ASSY PCB SUB	FR-4, 2LAYER , 29.2*38 , TURRET SUB L	1	SA	

1. Remote control receiver module
2. Cliff Sensor connector
3. Sensor board connector

7-4. PBA-TURRET-SUB-RIGHT

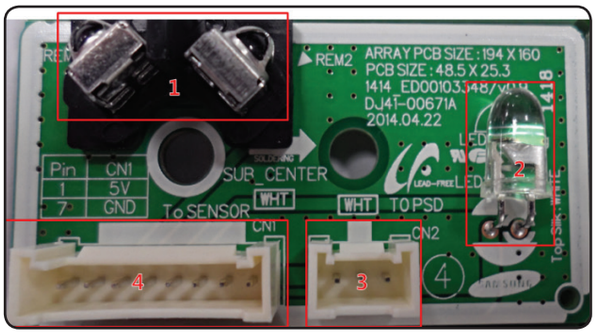


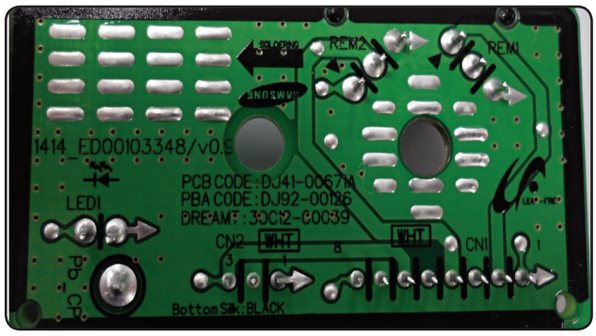


Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ92-00122A	ASSY PCB SUB	FR-4, 2LAYER , 29.2*38 , TURRET SUB R	1	SA	

1. Remote control receiver module
2. Cliff Sensor connector
3. Sensor board connector

7-5. PBA-TURRET-SUB-CENTER

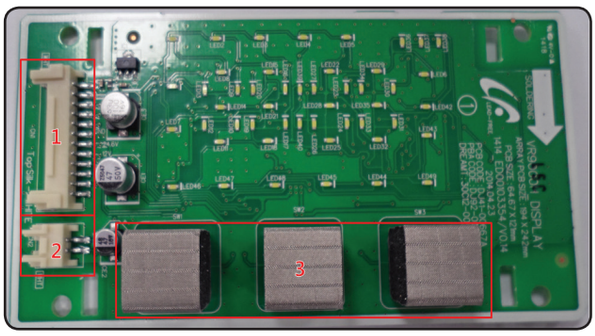


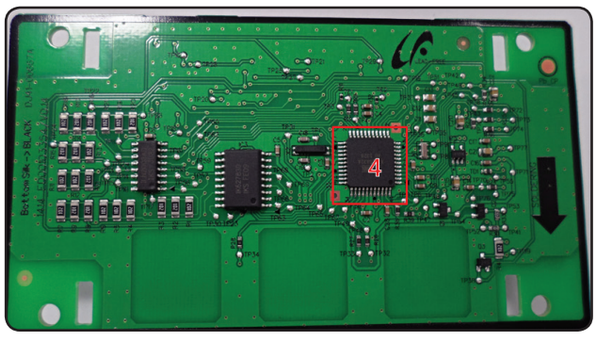


Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ92-00126A	ASSY PCB SUB	FR-4, 2LAYER , 48.45*25.3 , TURRET SUB C	1	SA	

1. Remote control receiver module
2. IR-LED (for docking detection)
3. PSD sensor connector
4. Sensor board connector

7-6. PBA-DISPLAY

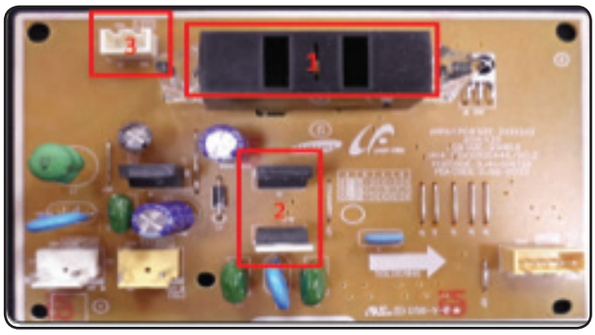


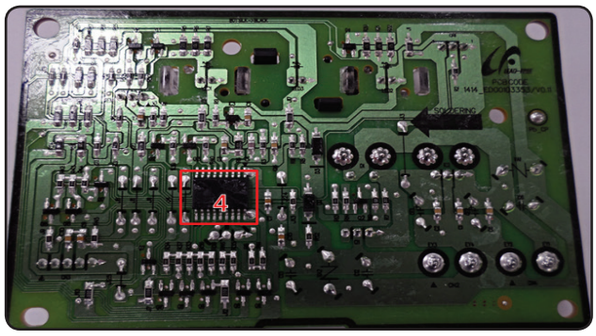


Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ92-00124A	ASSY PCB DISPLAY	DISPLAY,VR9000H,64.5X121,21.6V,Yes	1	SA	

1. Main board connector
2. Buzzer connector (for export)
3. Touch button
4. MICOM (touch, for display control)

7-7. PBA-CONTROL

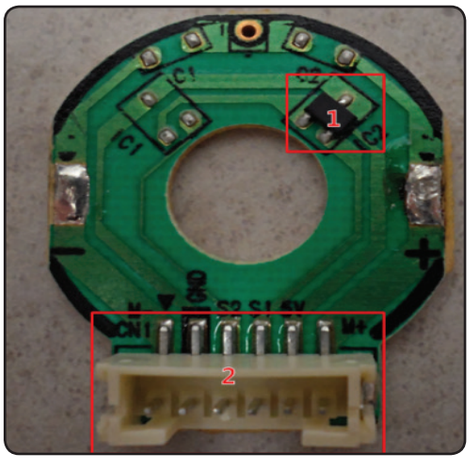




Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ92-00127A	ASSY PCB SUB	FR-1 , 1LAYER , 121*80.6 , PBA CONTROL	1	SA	

1. Charger infrared signal output
2. Charger power output ON/OFF control circuit
3. Charger DISPLAY connector
4. Charger MICOM for control

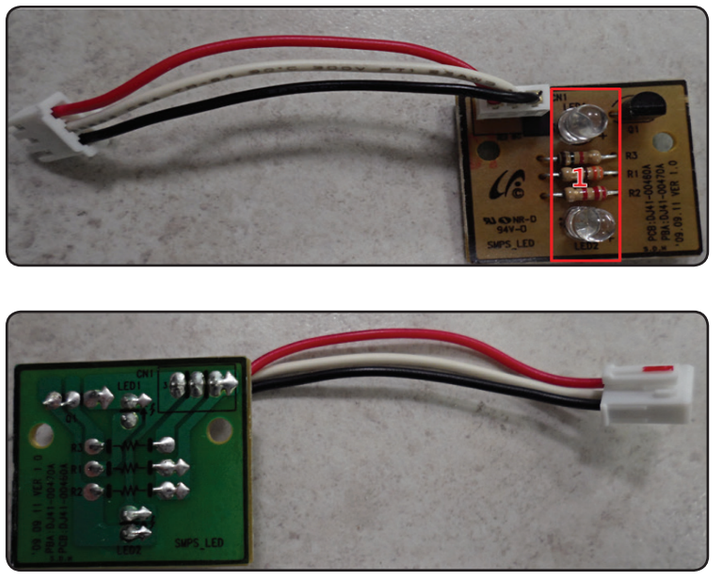
7-8. PBA-DRUM



Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ41-00554A	PBA SENSOR-MOTOR	AUTOBOT,25.8X31,N,HALL SENSOR/ DRUM/LOCK	1	SNA	

1. Drum motor ENCODER
2. Drum motor connector

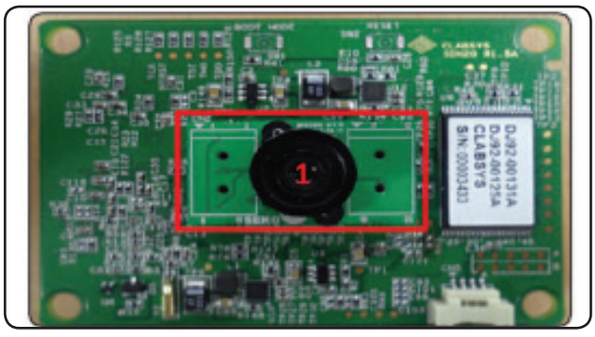
7-9. PBA-CHARGER-LED

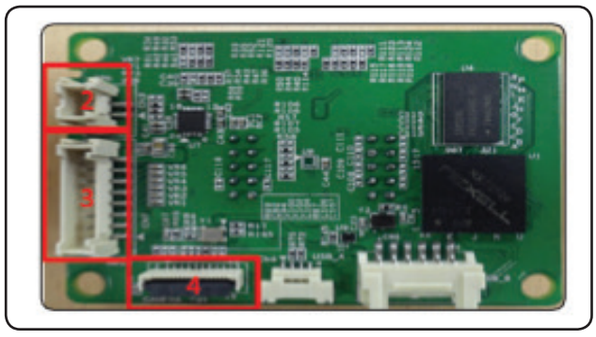


Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ41-00470B	ASSY PCB SUB	Charger_LED,VR9000H,32X28,Yes	1	SA	

1. Charger status display LED

7-10. ASSY VISION MODULE



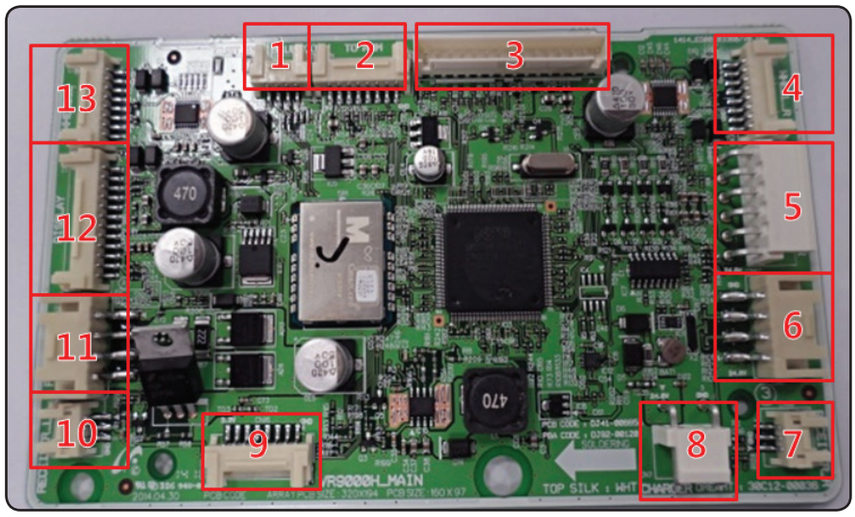


Part number	Material code	Part name	Specifications	Quantity	Service/ no service	Other
1	DJ92-00125B	ASSY MODULE	VISION MODULE,VR9000H,CAMERA,WiLD PLUS,Standard	1	SNA	

1. Camera module (for ceiling recognition)
2. Speaker connector
3. MAIN – VISION MODULE connector
4. SENSOR – VISION MODULE connector

7–11. Connector arrangement and details

7–11–1. PBA MAIN



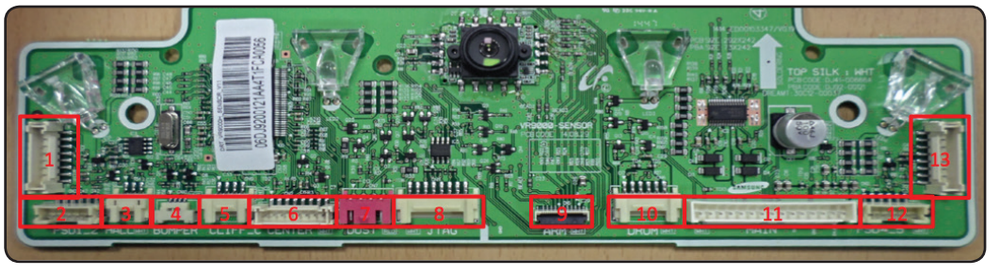
Number	Connector Number	Function	Pin Number	Signal name	Other
1	CN10	For process testing	1	5V	
			2	BLUETOOTH_RX	
			3	BLUETOOTH_TX	
			4	GND	
2	CN6	VISION MODULE I/F	1	GND	
			2	GPIO1	
			3	–	
			4	–	
			5	RESET_ARM	
			6	TXD_VISION	
			7	RXD_VISION	
			8	5V	

Number	Connector Number	Function	Pin Number	Signal name	Other
3	CN11	SENSOR I/F	1	Battery power	
			2	Battery power	
			3	GND	
			4	GND	
			5	5V	
			6	TURRET_IR	
			7	TXD_SENSOR_IN	
			8	RXD_SENSOR_IN	
			9	SENSOR_PWM	
			10	CLIFF_L_AD_RX	
			11	CLIFF_R_AD_RX	
			12	CLIFF_C_AD_RX	
			13	HALL_SENSOR	
			14	SENSOR_MCU_RESET	
			15	TURRET_SYNC	
4	CN4	WHEEL RIGHT	1	Motor–	
			2	GND	
			3	LIFT_R	
			4	Wheel_Ren2	
			5	Wheel_Ren1	
			6	5V	
			7	GND	
			8	Motor+	

Number	Connector Number	Function	Pin Number	Signal name	Other
5	CN17	Suction motor	1	Vbatt	
			2	SUCTION	
			3	Suction_FB	
			4	Suction_sleep	
			5	Suction_thermistor	
			6	GND	
6	CN5	BATTERY I/F	1	BATTERY TERMINAL	
			2	BAT_SCL	
			3	BAT_SDA	
			4	GND	
7, 10	CN8, CN18	Remote control module	1	RECEIVER_REAR_L / REAR_R	
			2	Remote control power (3.3V)	
			3	GND	
8	CN7	Charging socket	1	Charging power	
			2	–	
			3	GND	
9	CN16	JTAG MICOM UPDATE	1	3.3V	
			2	RESET	
			3	TRSTN	
			4	TDI	
			5	TDO	
			6	TCK	
			7	TMS	
			8	GND	
11	CN2	POWER SWITCH	1	CHARGER TERMINAL IN	
			2	CHARGER TERMINAL OUT	
			3	BATTERY TERMINAL OUT	
			4	BATTERY TERMINAL IN	
12	CN26	DISPLAY I/F	1	–	
			2	–	
			3	MISO_DISPLAY	
			4	MOSI_DISPLAY	
			5	SCLK_DISPLAY	
			6	GND	
			7	Power 21.6V	
			8	12V	
			9	power_onoff_system	
			10	CS_DISPLAY	
			11	Docking_onoff_system	
			12	GND	

Number	Connector Number	Function	Pin Number	Signal name	Other
13	CN3	WHEEL LEFT	1	Motor–	
			2	GND	
			3	Lift_L	
			4	Wheel_Len2	
			5	Wheel_Len1	
			6	5V	
			7	GND	
			8	Motor+	

7-11-2. PBA-SENSOR



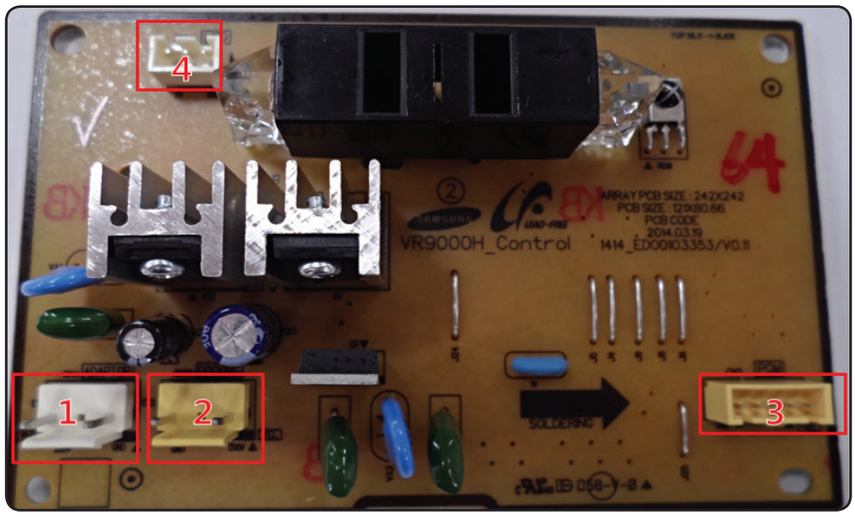
Number	Connector Number	Function	Pin Number	Signal name	Other
1	CN1	SUB LEFT I/F	1	5V	
			2	CLIFF_PWM_OUT_L	
			3	CLIFF_L_AD_RX	
			4	VIRTUAL_LEFT	
			5	Remote control power(5V)	
			6	TURRET_IR	
			7	GND	
			8	-	
2	CN13	PSD LEFT	1	PSD_AD1_VCC(5V)	
			2	GND	
			3	PSD_AD1	
			4	PSD_AD2_VCC(5V)	
			5	GND	
			6	PSD_AD2	
3	CN8	HALL SENSOR	1	5V	
			2	HALL SENSOR OUT	
			3	GND	
4	CN10	BUMPER	1	BUMPER_RIGHT_FRONT	
			2	GND	
			3	BUMPER_LEFT_FRONT	
			4	GND	
5	CN9	CLIFF CENTER	1	CLIFF_PWM	
			2	GND	
			3	CLIFF_C_AD_RX	
			4	5V	

Number	Connector Number	Function	Pin Number	Signal name	Other
6	CN2	SUB CENTER I/F	1	5V	
			2	DOCKING_LEFT	
			3	DOCKING_RIGHT	
			4	Remote control power(5V)	
			5	DOCKING_IR	
			6	PSD_AD3	
			7	GND	
			8	PSD_AD3_VCC(5V)	
7	CN7	DUST SENSOR	1	5V	
			2	PhotoTR_Emitter	
			3	IR_Cathode	
			4	5V	
8	CN11	JTAG MICOM UPDATE	1	5V	
			2	RESET	
			3	TRSTN	
			4	TDI	
			5	TDO	
			6	TCK	
			7	TMS	
			8	GND	

Number	Connector Number	Function	Pin Number	Signal name	Other
9	CN5	VISION MODULE I/F	1	GND	
			2	GND	
			3	2.8V PULL-UP	
			4	2.8V PULL-UP	
			5	SENSOR_IR_TX	
			6	FRONT_CAM_PCLK	
			7	GND	
			8	FRONT_CAM_MCLK	
			9	I2C_SCL1	
			10	I2C_SDA1	
			11	FRONT_CAM_Y7	
			12	FRONT_CAM_Y6	
			13	FRONT_CAM_Y5	
			14	FRONT_CAM_Y4	
			15	FRONT_CAM_Y3	
			16	FRONT_CAM_Y2	
			17	FRONT_CAM_Y1	
			18	FRONT_CAM_Y0	
			19	FRONT_CAM_nRST	
			20	2.8V	
10	CN6	DRUM MOTOR	1	MOTOR OUT+	
			2	5V	
			3	Drum_encoder	
			4	-	
			5	GND	
			6	MOTOR OUT-	
11	CN4	MAIN I/F	1	Battery power	
			2	Battery power	
			3	GND	
			4	GND	
			5	5V	
			6	TURRET_IR	
			7	RXD_MAIN_IN	
			8	TXD_MAIN_IN	
			9	SENSOR_PWM	
			10	CLIFF_L_AD_RX	
			11	CLIFF_R_AD_RX	
			12	CLIFF_C_AD_RX	
			13	Hall_sensor	
			14	SENSOR_MCU_RESET	
			15	TURRET_SYNC	

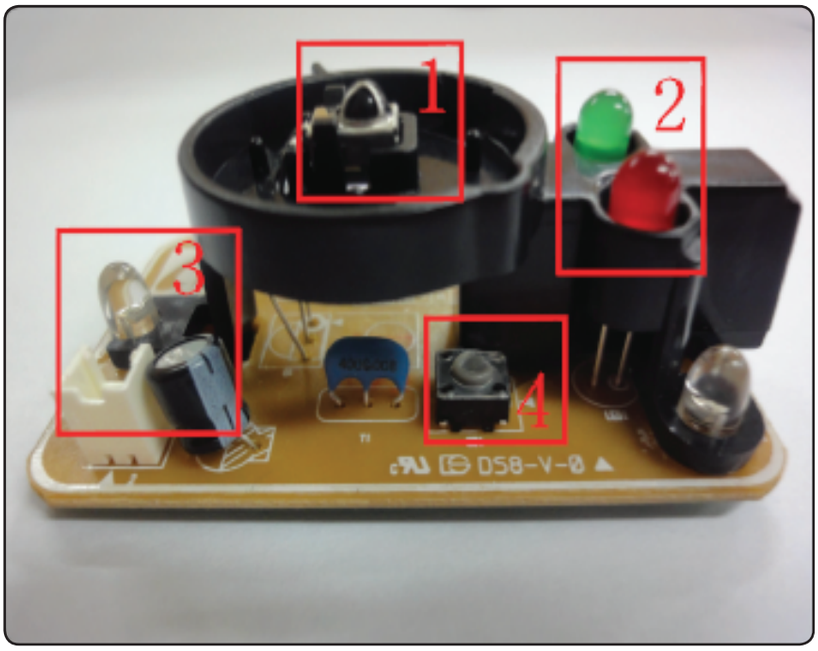
Number	Connector Number	Function	Pin Number	Signal name	Other
12	CN12	PSD RIGHT	1	PSD_AD4_VCC(5V)	
			2	GND	
			3	PSD_AD4	
			4	PSD_AD5_VCC(5V)	
			5	GND	
			6	PSD_AD5	
13	CN3	SUB RIGHT I/F	1	5V	
			2	CLIFF_PWM_OUT_R	
			3	CLIFF_R_AD_RX	
			4	VIRTUAL_RIGHT	
			5	Remote control power(5V)	
			6	TURRET_IR	
			7	GND	
			8	-	

7-11-3. PBA-CONTROL



Number	Connector Number	Function	Pin Number	Signal name	Other
1	CN4	Adapter I/F	1	GND	
			2	–	
			3	Charging power	
2	CN2	Docking detection	1	Battery line	
			2	–	
			3	GND	
3	CN3	PGM UPDATE	1	PGC	
			2	PGD	
			3	reset	
			4	5V	
			5	GND	
4	CN1	Charger status display LED connection	1	5V	
			2	CSTA	
			3	GND	

7-12. ASSY VIRTUAL GUARD (Virtual Guard : Option)



NO	CODE-NO	Part Name	Specification	Qty	Service	Remark
12	DJ41-00541A	PBA-SMARTGATE	FR1,W65XL39,SMARTGATE,DC3V	1	SA	

1. IR Receiver Module
2. Mode Lamp
3. IR Lamp
4. Mode Switch

8. Reference materials

8–1. Principles of operation

The most important, core function of the cleaning robot can be said to be quick, thorough cleaning of every area.

The cleaning robot model has the following functions.

1. It cleans using a vision method while detecting the indoor environment. Since it uses this vision method, it can clean all areas thoroughly and also draw a map while cleaning to distinguish between areas it has and hasn't cleaned, allowing it to clean faster and more effectively.

2. This is the quick return to charger method. When cleaning is complete or the battery is low, the robot can quickly and accurately return to its charger.

3. It uses a vacuum cleaning method.
   The powerful main brush and vacuum intake allow dust to be sucked up directly for better cleaning.

4. It uses a more efficient Power Brush to allow it to clean more effectively.

5. When the Obstacle Sensor encounters an obstacle during cleaning, it reduces speed to minimize the impact of the collision. The Bumper Sensor alleviates the impact of a collision and allows the robot to get right into corners to effectively eliminate dust.
   (The brighter the Obstacle Sensor's color, the better its sensitivity.)
   As well, there are three Cliff Sensors so the robot doesn't run into any trouble even in potentially dangerous areas such as stairs or entryways, allowing it to clean safely.

6. A special drive mechanism allows it to cross thresholds of less than 1.5 cm to clean all rooms in a house, and there is also an algorithm for moving between rooms so it can move into all rooms.

7. If the Obstacle Sensor encounters obstacles during cleaning, it continues to clean while avoiding them.
   (It may not sense thin, moving obstacles)

8-2. Model naming display conventions

Digit No	1st	2nd		3rd			4th	5th		6th	7th			8th		9th	10th			11th		12th	13th
	PRODUCT Type			Power&BRUSH				YEAR			Grade/PJT name			GRADE		Derivation	SEPC			Color		TRADE CODE	
	V	R		2			0	H		9	0			5		0	U			W			
		Canister	C	DOMESTIC (BRUSH)	Basic	3	3	2013	F	8	0	DRY/WE	Robot	Entry 1	1	0	Domestic (Canister, Upright, W&D)	Bagless	L	RED	R		
		Upright	U		Wet Mob	4	4	2014	H	3	0	WET (VR-F300K)		Entry 2	2	1		Bag	B	GRAY	G		
		W&D	W		Steam	5	5	2015	J	7	1	MaxPOP OUT (VR-710G)		Entry 3	3	2		Bag+먼지따로	T	BLUE	B		
		Robot	R		DC Sweeper	6	6	2016	K	9	0	Power		Middle 1	4	3		Cassette	C	SILVER	C		
		Stick	S		UV	7	7	2017	H	4	2	Autobot Light (VR-E420E)		Middle 2	5	4	Export (Canister, Upright, W&D)	Bagless + Body Variable	V	WHITE	W		
		Handy	H	Domestic/Export (Robot/Stick/Handy)	Handy	6	0	2018	J	8	0	Classic	Canister	Middle 3	6	5		Bag+Body variable	W	WINE/PINK	P		
					Stick	6	0	2019	K	8	0	Ballad		High1	7	6		Bagless + Handle	H	GREEN	N		
					Robot	2	0	2020	H	7	0	Presto		High2	8	7		Bag + On/off	J	GOLD	D		
						1	0	2021	J	6	0	Moderato		High3	9	8		Bagless + On/off	S	BROWN	S		
				EXPORT (power consumption)	750W	0	7	2022	K	5	0	Adagio						Bag + On/off	F	BLACK	K		
					100W	1	0	2023	H	4	0	Andante						Bagless + Handle + UV Brush	U	BEIGE	E		
					1100W	1	1	2024	J	3	0	Largo						Bag + Handle + UV Brush	Y	VIOLET	V		
					1200W	1	2	2025	K				Stick					Bagless + Handle + Power Brush	P	LUMINOUS	L		
					1300W	1	3	2026	H	4	0	Blues	Handy					Bag + Handle + Power Brush	Q				
					1400W	1	4	2027	J	8	0	Rhapsody BLDC	Upright				ROBOT	Touch	U				
					1500W	1	5	2028	K	7	0	Rhapsody						Tact	T				
					1600W	1	6	2029	H	4	0	Rhapsody Light					STICK	STICK	K				
					1800W	1	8	2030	J	8	0	Ambient	W&D					Stick UV	A				
					2000W	2	0										HANDY	HANDY	D				
					2100W	2	1											Handy UV	U				
					2200W	2	2																
					2400W	2	4																

8-3. Explanation of terminology

▪ Map Cleaning
A cleaning method in which the camera is used to take video of the ceiling to recognize the robot's location and draw a map of the area to be cleaned.

▪ Auto Clean method
If Auto Clean is pressed, the robot will recognize the structure of the room and automatically avoid obstacles while moving around to find uncleaned areas. If the battery is low, it will automatically return to the charger.

▪ Spot Clean method
The robot cleans a set area (1.5 m x 1.5 m) and stops when that area is cleaned.

▪ Manual Clean method
A cleaning method in which users use the directional buttons on the remote control to clean as they wish. The intake motor, Power Brush, etc. operate. Stops when an obstacle is encountered.

▪ One-Time Schedule
It will start cleaning at the set time and when the battery is low, the robot will quickly return to its charger as it does in the Auto Clean mode.

▪ Daily Schedule
A method in which the robot automatically cleans every day at a set time.

▪ Emergency switch
Located on the bottom of the robot, this switch can be used when the robot is to be stored for a long time or when a problem occurs during cleaning and action must be taken. This function stops all power from the battery or from the charger.

▪ Charging method
Charging methods are divided into automatic and manual methods. Automatic charging methods are those in which the robot recognizes by itself that its battery is depleted and automatically returns to the charger. Manual methods are those in which the user moves the robot to the charger.

▪ Charging time
This refers to the time it takes to charge the cleaning robot, and it takes about 160 minutes to charge a completely drained battery to full.

▪ Cliff Sensor
This is an infrared light sensor that prevents the robot from falling in areas with height differences such as stairs or entryways. It detects height differences of about 5 cm and automatically moves the robot away. Cliff Sensors are installed in three places on the robot's bottom: one each on the front, left and right.

▪ Return to Charger
If the battery becomes low during cleaning, the robot automatically returns to the charger. Alternatively, if the user presses the the Return to Charger button on the robot's main body or the remote control, the robot can find the charger itself and recharge.

▪ Gap Sensor
This is safety equipment which stops all cleaning functions when a user lifts the robot.
There is one on each drive wheel.

▪ Obstacle Sensor
The Full view sensor on the front of the cleaning robot detects obstacles and reduces speed. It senses obstacles from a minimum distance of 4 cm away. There may be differences in sensitivity depending on the color and brightness of obstacles.
If dust or dirt accumulates on the sensor window, it may malfunction. In that case, wipe down the window with a soft cloth.

▪ Bumper Sensor
This is a sensor that detects when the cleaning robot's front bumper is pressed as a safety precaution to help with detection and avoidance in case the Obstacle Sensor on the front fails to detect an obstruction.
It is a physical sensor that detects when the bumper encounters an obstacle.

▪ Drive wheel encoder
This sensor detects the wheels' rev count and can be used to detect wheel speed, control, mileage conversion, or foreign matter caught in the wheel.
It comprises a magnet and Hall sensor and can detect rotation speed through the magnet or through rotation as the wheel turns.

▪ Power Brush encoder

A sensor that detects the number of Power Brush rotations and whether there is foreign matter caught in the Power Brush.
It comprises a magnet and Hall sensor and detects the motor's rev count.

- **Max Clean**
  A cleaning method in which the robot cleans until its battery is drained.

- **Silent Mode**
  When operating in Silent Mode, the robot cleans more quietly than in Standard Mode.
  (Standard/Silent modes can be set using the remote control.)

- **Smart Turbo**
  If dust enters the cleaning robot, it concentrates cleaning on a specific area. (Can be operated using the remote control.)

8–4. Q & A

Problems	Checking and steps to take
The suction power is weak during cleaning.	■ Check whether there is dust in the dustbin. - Stop the cleaning robot and empty the dustbin. ■ Check whether the dustbin is completely full. - Empty the dustbin. ■ Check whether the intake is blocked by foreign matter. - Turn off the emergency switch and remove foreign matter from the intake. ■ Check whether the filter is blocked. - Wash the filter thoroughly.
The robot enters prohibited areas even after I have installed virtual guard.(Option)	■ Check whether the virtual guard is installed about 15 cm in front of the prohibited area. - Install virtual guard about 15 cm in front of the prohibited area.
The cleaning robot does not move at all before cleaning.	■ Is the emergency switch turned on? - Turn on the emergency switch. ■ Is the cleaning mode indicated on the display panel? - Press the cleaning mode button on the upper part of the set. (When off, press the button for 3 seconds or more.) ■ Are all icons off in the display panel? - Hold down the button on the main body. ■ Is one bar of battery life blinking on the display panel while "Lo" is displayed? - Carry the cleaning robot to the charger to charge. ■ If the remote control's battery is drained, it does not work. - Replace the battery. (Type AAA)
The cleaning robot does not move at all during cleaning.	■ Is one bar of battery life blinking on the display panel while "Lo" is displayed? - Carry the cleaning robot to the charger to charge. ■ Is the cleaning robot caught on a cord on the floor? - Turn off the emergency switch, then remove the cord from the floor. ■ Is the cleaning robot caught in an area with a large height difference between floors? - Turn off the emergency switch, then move the cleaning robot to another area. ■ Is there any thin fabric caught in the drive wheel or is the drive wheel off the ground? - Turn off the emergency switch, then remove the fabric. ■ Is the cleaning robot caught on a threshold? - Turn off the emergency switch, then move the cleaning robot to another area.
Is the communication distance between the cleaning robot and charger short enough for automatic charging?	■ The detection distance for automatic charging is about 5 m, and at more than 5 m the cleaning robot follows the wall to find the location of the charger.
Is the battery inside the cleaning robot completely drained?	■ The cleaning robot's display LED is completely off.

Problems	Checking and steps to take
The robot doesn't always return to the charger.	■ You must install in a living room where the front of the charger is easy to detect in order for Return to Charger to work well. - Since the cleaning robot and charger communicate via infrared, install the charger where it can be easily detected by the robot. ■ There must be no obstacles around the charger for Return to Charger to work. - There must be no obstacles within 0.5 m to the left/right and 1 m in front of the charger. ■ Install the charger in a level place right next to the wall. ■ When testing Return to Charger, put the cleaning robot more than 1.5 m in front of the charger and press the "Return to Charger" button. - Reference: If you put the cleaning robot directly in front of the charger and test Return to Charger, Return to Charger does not work well. ■ If you put the robot more than 1.5 m in front of the charger and press the "Return to Charger" button to do the Return to Charger test but the robot does not return, there may be a malfunction. Exchange the charger. ■ If the charger is in the same room as the robot, the robot moves along the wall until it finds the charger. - This is normal.
If a person is directly in front of the charger to see if Return to Charger is working, it may not work well.	■ This is not a malfunction, but the charger's infrared signal is reflected by a person, which can cause problems with Return to Charger.
The robot doesn't return to the charger.	■ If you put the robot more than 1.5 m in front of the charger and press the "Return to Charger" button to do the Return to Charger test but the robot does not return, there may be a malfunction. Exchange the charger.
Charging is complete and FULL is indicated on the display, but the robot stops or immediately indicates LO.	■ Exchange the battery or PBA MAIN on the main body.
Recharging takes a long time.	■ Recharging normally takes 160 minutes, but if the battery temperature is high (especially in summer), the charging time is longer. (This is normal)
The robot does not recharge.	■ Check for battery malfunction ■ Check for charger malfunction ■ Check for PBA MAIN malfunction on the main body of the cleaning robot
How to check for charger malfunction	■ If the power lamp on the charger flickers or is not lit while the robot is docked at the charger, the charger's power equipment is malfunctioning. Exchange the charger PBA.
The C05 (bumper) error message is displayed.	■ The Bumper Sensor is malfunctioning. Disassemble the main body, then adjust the area where the bumper is pressed or exchange the MICRO S/W.

Problems	Checking and steps to take
The C02, C03 (wheel) error message is displayed.	■ When C02 (left wheel) or C03 (right wheel) occur, check for foreign matter caught in the wheel and then remove the foreign matter. ■ Alternatively, if C02 (left wheel motor) or C03 (right motor wheel) problems arise, exchange the gear drum motor.
The C1 (Power Brush) error message is displayed.	■ If there is anything such as socks, hair or string caught in the Power Brush drum, detach the Power Brush and remove the foreign matter.
The robot cannot cross over a threshold.	■ The robot cannot cross over thresholds less than 1.5 cm high.
The robot bumps into obstacles.	■ Since the sensor cannot detect thin furniture such as chair legs, dark objects, mirrors or glass, these are detected by the Bumper Sensor. ■ Bumping will be reduced if you put chairs on a table during Auto Clean.
There are no bumps during cleaning, but the robot often bumps into things during Return to Charger.	■ During Return to Charger the Obstacle Sensor becomes less sensitive and the robot may bump into objects. When the robot is following a wall in particular, it may bump into obstacles.
Immediately after I press Auto Clean, the robot moves in reverse. (Two possible malfunctions)	■ If there is a malfunction in the main body charger board sensor. - Exchange the charger board sensor, check assembly of the sensor connectors. ■ If there is a Cliff Sensor malfunction. - Remove foreign matter from the Cliff Sensor window, exchange the Cliff Sensor, check assembly of the sensor connectors.
The robot falls in the veranda or bathroom.	■ Remove contamination from the Cliff Sensor. ■ Install virtual guard 15 cm in front of the area where the robot may fall.(Option) ■ Close the veranda or bathroom door.
The robot was fine when I started using it, but the more I use it, the worse the noise gets.	■ You can reduce the sound by emptying the dustbin or cleaning the dustbin filter. ■ Please check if there is any foreign substance stuck in the drum brush or drive wheels.
There is a sound like paper or vinyl rustling (crackling) during cleaning.	■ Turn off the emergency switch, turn over the cleaning robot and check for foreign matter in the Power Brush. Remove any matter you find.
During Spot Cleaning, the robot cleans in a circle even without any obstacles and one wheel spins or stops.	■ Turn the emergency switch off and then on again to solve the problem. If the same problem reoccurs, this is a Gyro Sensor malfunction. Exchange the PBA MAIN.
The robot does not clean evenly.	■ Clear the room of obstacles (towels, boards or toys). ■ Put chairs on a table while cleaning. ■ Close the door and then clean the living room or main room.
After cleaning is finished, the robot does not return to the charger.	■ If the cleaning robot does not start cleaning at the charger and cannot find the charger while cleaning, it stops around the area where it first started cleaning. (Normal)

Problems	Checking and steps to take
The robot suddenly cleans in a diagonal line.	■ Diagonal cleaning may occur in the cases below. - If charging was done at an angle to the charger. - If the shortest path after cleaning is by moving through another area. - If the angle between the cleaning robot and an obstacle is not perpendicular (90 degrees). - If the floor is tile or wood. ▶ The cleaning robot draws a map to clean based on its initial location so that it does not omit any areas. (Normal operation) Install the charger with the grain of the wood and start cleaning while the cleaning robot is docked on the charger.
The main body buttons do not work.	■ If main body buttons are pressed while the emergency switch is in the on position, they may not work even if power is on. ▶ Turn off the emergency switch and wait 2 minutes, then set down the main body and turn on the power while avoiding pressing any buttons.
The product continuously spins round and round at the same place while cleaning.	■ Check if the Smart Turbo function is turned on. ▶ If the Smart Turbo function is turned on, the product intensively cleans by rotating when it passes a place with much dust. (You can turn on or off the Smart Turbo function with the Remote Control. However, if you turn the Emergency Switch off and then turn the Switch on, the Smart Turbo function will be turned on again.) ■ The product rotates with “DUST” displayed on the Display window even though there is no dust. ▶ Check if there is any foreign substance in between the Dust Bin and the Power Brush, and then remove it.

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